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ARCHAEOLOGY

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By George F. Bass and Peter Throckmorton

Photographs by H. Greer, P. Throckmorton, P. Dorrell and M. Kapkin

The wreck lay between two tiny islands just off Cape Gelidonya, Turkey. Map by Eric Parkinson.

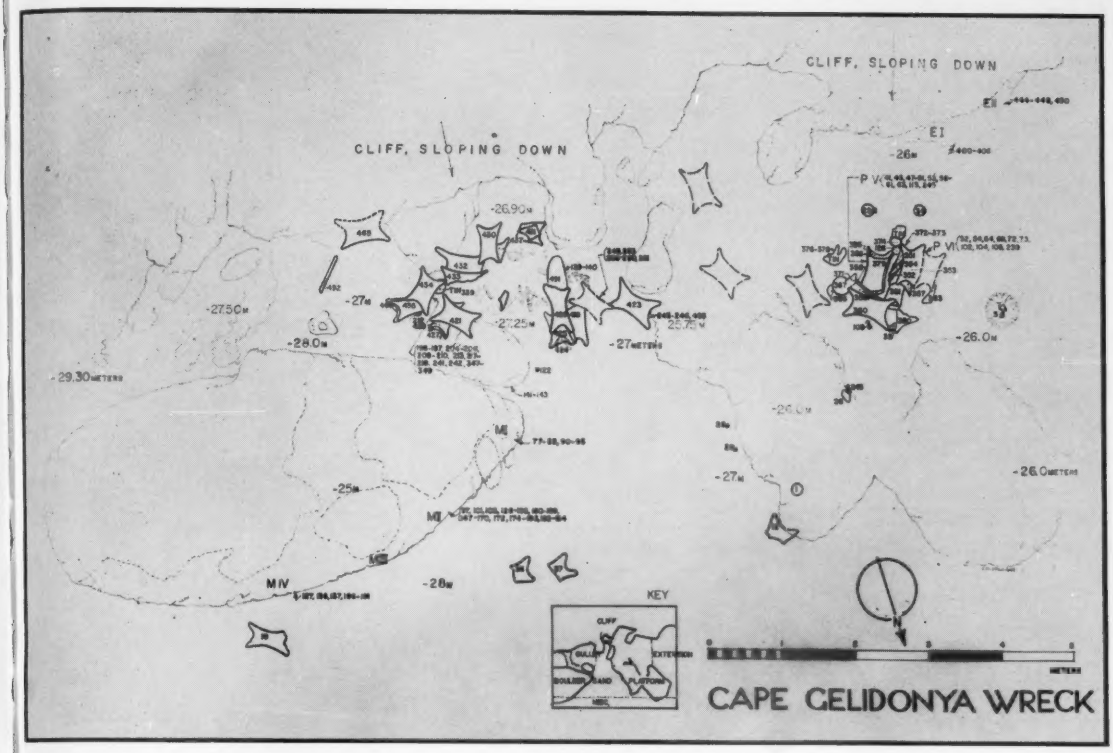
EXCAVATING A BRONZE AGE SHIPWRECK

THE ROMANCE, the danger and the mystery of underwater archaeology have been vividly described by both archaeologists and divers. Chance finds from beneath the sea have aroused excitement in themselves: the Zeus from Artemisium, the Marathon Boy, the Demeter, now in Izmir, that was found by Bodrum sponge-draggers, the Anticythera statues and many others.

In the beginning, underwater work was done by helmeted sponge-divers, sometimes under the direction of an archaeologist who sat in a ship on the surface and noted the finds as they were raised. Later, after the development of the Aqualung, attempts were made to excavate ancient wrecks systematically, notably along the French and Italian coasts. Again the work was done entirely by divers, few of whom had a real concept of archaeological work. Although a land archaeologist would not attempt the publication of a site he had never visited, he was now forced to rely completely on the plans and reports of others. Photographs and underwater television were of some help, but scientific excavation was certainly difficult, if not impossible, under such conditions. Now, owing to these pioneer efforts, excavation can be accomplished under water almost as efficiently as on land.

In the summer of 1960 the University Museum of the University of Pennsylvania sent an expedition to Cape Gelidonya, Turkey, where it was known that a Late Bronze Age shipwreck lay. (The wreck had been dated to the thirteenth century B.C. by the types of tools and pottery raised from it the previous summer.) It was felt that an underwater excavation should be directed on the bottom by an archaeologist, and our experience has now shown that all the specialists of a land dig should and can be present in such work. It is far easier to train an archaeologist or architect or photographer to dive than it is to train a diver to perform their functions properly. Ideally, all members of an undersea excavation should have had some experience on land digs. Furthermore, diving apparatus is only a means of getting to the bottom; once there, almost all of the jobs can be performed exactly as they are on land. Although certain difficulties

COVER: **Searching the sea-bottom** and photographing the work. Left, Claude Duthuit; right, Peter Throckmorton. The double-tanks shown in the photo were made by U. S. Divers.



The subdivisions of the wreck were labeled after names we gave to naturally defined areas: **G** for Gulley, **P** for Platform, **S** for a flat Sandy area, **M** and **E** for Miscellaneous and Extension. A grid system was unnecessary. Drawing by C. K. Williams.

arise from time limitations, strong currents, equipment maintenance and, at times, poor visibility, there is no substitute for the slow, painstaking thoroughness which is used in land excavations. Thus, by skipping some of the more spectacular diving equipment not required for this particular job, and by working from locally hired boats, we not only achieved the desired results but also avoided the staggering costs of some of the earlier efforts.

The first problem, naturally, is to locate a wreck. Weekend skin-divers have found sites in the Mediterranean, but the best source of information is the sponge-divers of Turkey and Greece. These men have spent their lives walking on the bottom of the sea, constantly moving to find more sponges. Their knowledge of the coastal sea-bed is amazing. Both the Bronze Age wreck and a Byzantine wreck which we surveyed later in the summer are among a large number of ancient ships discovered by the sponge-divers of Bodrum. To relocate these ships however is not an easy matter. [In a later issue Mr. Throckmorton will discuss search and survey methods in detail.—Ed.]

Once the wreck had been identified, an expedition formed and a camp established, we set to work. With the help of an international group of archaeologists and divers, we plotted the remains of the ship and its cargo and then started the work of raising it to the surface. Frédéric Dumas, one of the world's best known divers, was our chief diver, and to him must go credit for many of the novel ideas that made the expedition a success. Little of the hull remained, owing to the rocky bottom, with almost no sand or mud to cover and preserve wood, but we were able to obtain the first evidence for the size of planks and dowels used by Homeric shipwrights. The size of the ship was estimated by the distribution of the cargo, still lying in neat piles just as it had been stowed on board.

This cargo contained the largest hoard of pre-Classical metal tools and ingots yet found on land or under the sea. Over a ton of copper and bronze was raised and preserved. Most of the copper is in the form of so-called "ox-hide" ingots, many with foundry marks stamped in the metal while it was still soft. Axes, adzes, picks, hoes, mirrors, knives, spear-points, awls, bowls and an arrowhead are of bronze. Some of these are complete but most

The *Lutfi Gelil* moors above the wreck. The shipwreck probably took place on these jagged rocks in the thirteenth century B.C.

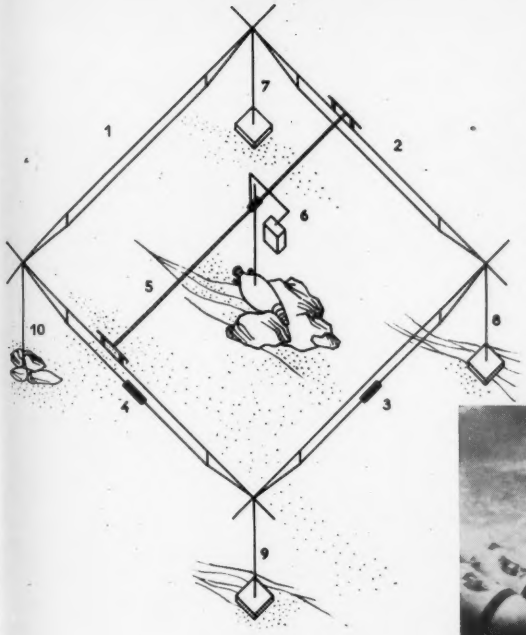
Shipwreck continued

are broken, as if they had been carried for their metal content, to be melted down and recast. The copper ingots were to have been used for making more bronze; a quantity of tin was found, the earliest deposit of this material so far discovered.

In the east end of the ship were found personal possessions which must indicate living quarters of some sort: Egyptian scarabs, polished stone mace-heads, almost fifty apothecary's weights, pieces of crystal, the only lamp definitely identified and, nearby, a finely carved cylinder seal. Here were also the remains of a meal: olive pits and bones of fish, birds and some domestic animal. These are some of the results, which will be published completely after further study. Here we are concerned with method.

EACH MORNING we sailed out to a spot immediately above the wreck, where we moored to an oil drum buoy anchored over the site. Our boats were typical Bodrum sponge-boats. One boat, the thirty-six-foot-long *Mandalinci,* was commanded by Captain Kemal Aras, who first spotted this wreck several years ago. The other was the *Lutfi Gelil,* used mainly for carrying diving equipment and raising heavy masses.

We usually dived with Aqualungs, compressed-air tanks with pressure regulators. When our high-pressure air-compressors were being repaired and it was impossible to fill the tanks, we dived with hoses running from the *Mandalinci's* compressor to our regulators. This allowed longer dives when desired, for the air was not limited to the amount a tank would hold. Diving with air-hoses had its drawbacks, however; the drag of 150 feet of hose in a strong current is formidable. It was necessary to descend hand over hand on a shot line fastened from the sea-bed to the *Mandalinci,* and once



A drafting frame designed for underwater excavation. Horizontal pieces (1,2,3,4) are leveled on telescoping legs (7,8,9,10). Piece 5 rides back and forth on this frame until it is over the object to be plotted. Then a vertical bar is slid along on 5 until it is directly over the object. Coordinates may be read from calibrations on 2, 4 and 5. The vertical bar on 5 allows the level to be read, as it is calibrated. 6 is a camera attachment which allows a photograph to be taken from exactly above the object, and the coordinates may again be recorded for this photograph. Design by Claude Duthuit.

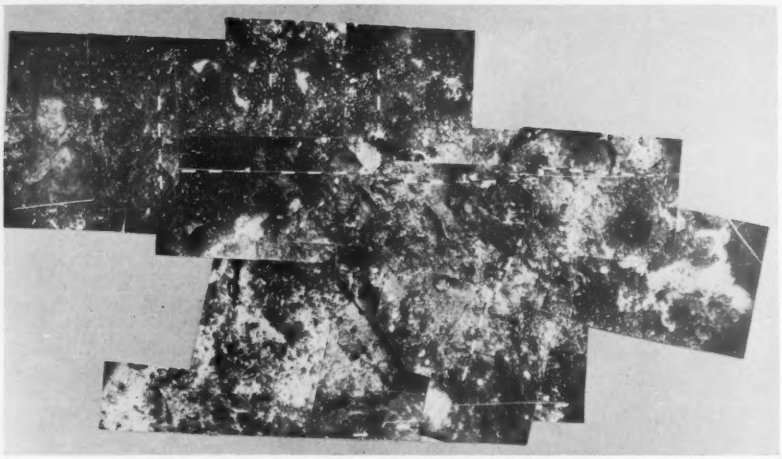
One diver writes measurements on a sheet of plastic with an ordinary pencil, while the other prepares to move the measuring line. The line was kept horizontal by sliding it up and down on the vertical pole.

on the bottom movement was possible only by pulling ourselves from rock to rock with our hands. The current could also pull a twist or loop in the hose into a kink, cutting off the diver's air supply. More than once, two of us had to ascend sharing one air-hose. Most unfortunate was the fact that the current sometimes slowed excavation to the extent that ten-minute jobs took as much as forty minutes. It was impossible for a helmeted diver to descend under those conditions.

The first task is to clean a site thoroughly of seaweed. Next, the remains should be recorded both by plans and photographs. Our survey was made by triangulating from spikes driven into the rock bottom at various points around the wreck. This method of plotting, while proving quite accurate, was found to be too time-consuming. For the future we shall use a metal frame placed over the wreck.

In addition to the survey, several photographic montages of the entire area were used. These were made by a photographer swimming at a fixed distance above the wreck, taking pictures with an absolutely level camera; a plumb-line and level were attached to the camera to make this possible. We are hoping, in later campaigns, to mount the camera on the drafting frame mentioned above. This will both save time and guarantee accuracy. The pictures taken from the overlay were printed at a fixed scale, using the two-meter rods in each picture as a guide. The pictures were then cut up and glued together, with as much overlap as possible in order to offset the lens distortion around the edges of the pictures. The finished product was only a means of checking details on the drawn plan. We also experimented with a Polaroid camera, especially adapted for underwater work, but after a promising beginning this was swept away by the current in the only such accident of the season.

The placement of ingots and other objects, while now



The first photographic survey showed how little was visible in the sea-weed and lime concretion. We used a Nikon underwater camera, f. 5.6 at 125th of a second, with Plus X film. All of the black-and-white photographs were made with natural light.

Shipwreck continued

quite plain on the plan, was far from plain on the bottom. Several inches of lime deposit, as hard as concrete in places, covered most of the cargo and hull; only an occasional piece protruded from this mass. To attempt to clean individual objects under water would have taken far too long and would have been dangerous to the more fragile objects. Therefore we chiseled loose large masses or lumps of material weighing from only a few pounds to over four hundred pounds. These were labeled and drawn on the sea-bottom. When a lump had been partially freed from the mass surrounding it, and the shear line was obvious, an automobile jack was used to pry it loose. Although this sounds quite rough, on no occasion did we break an object. The freed lump was attached to a cable and raised with a winch onto the *Lutfi Gelil*.

The mass which covered the only surviving portion of the hull had to be raised more gently. This was tied to a large plastic balloon which was inflated on the bottom with air from a diver's mouthpiece. The lift could be carefully controlled and there was no danger of damaging the load; when lifting with a cable and winch from above, in a rough sea, there was some chance of this happening. On deck these lumps showed nothing of what they might contain, but on the beach at the camp they could be fitted together so that a number of them would lie exactly as they had on the sea-bottom. These were then cleaned in place, drawings were made, and the drawings were related to the plan by orienting it to the known points that had been plotted on the bottom before the lump was raised. Single ingots and smaller lumps could be dealt with more easily. These were plotted on the bottom and raised in a steel-wire basket. Sherds and ballast stones were collected in baskets like those used on land digs, and bits of wood and matting were protected in plastic bags while being raised.

ALL THE FINDS were turned over to Miss Joan du Plat Taylor, who represented the Institute of Archaeology of the University of London, which took the responsibility of cleaning, preserving, cataloguing and photographing all the objects. The metal pieces were cleaned manually, both with hand-chisels and with electric vibrating tools, and were then placed in a fresh-water spring which we had dammed up for this purpose. The constantly flowing water began to soak out the corrosive salt, a process which is still going on in concrete tanks in Bodrum.

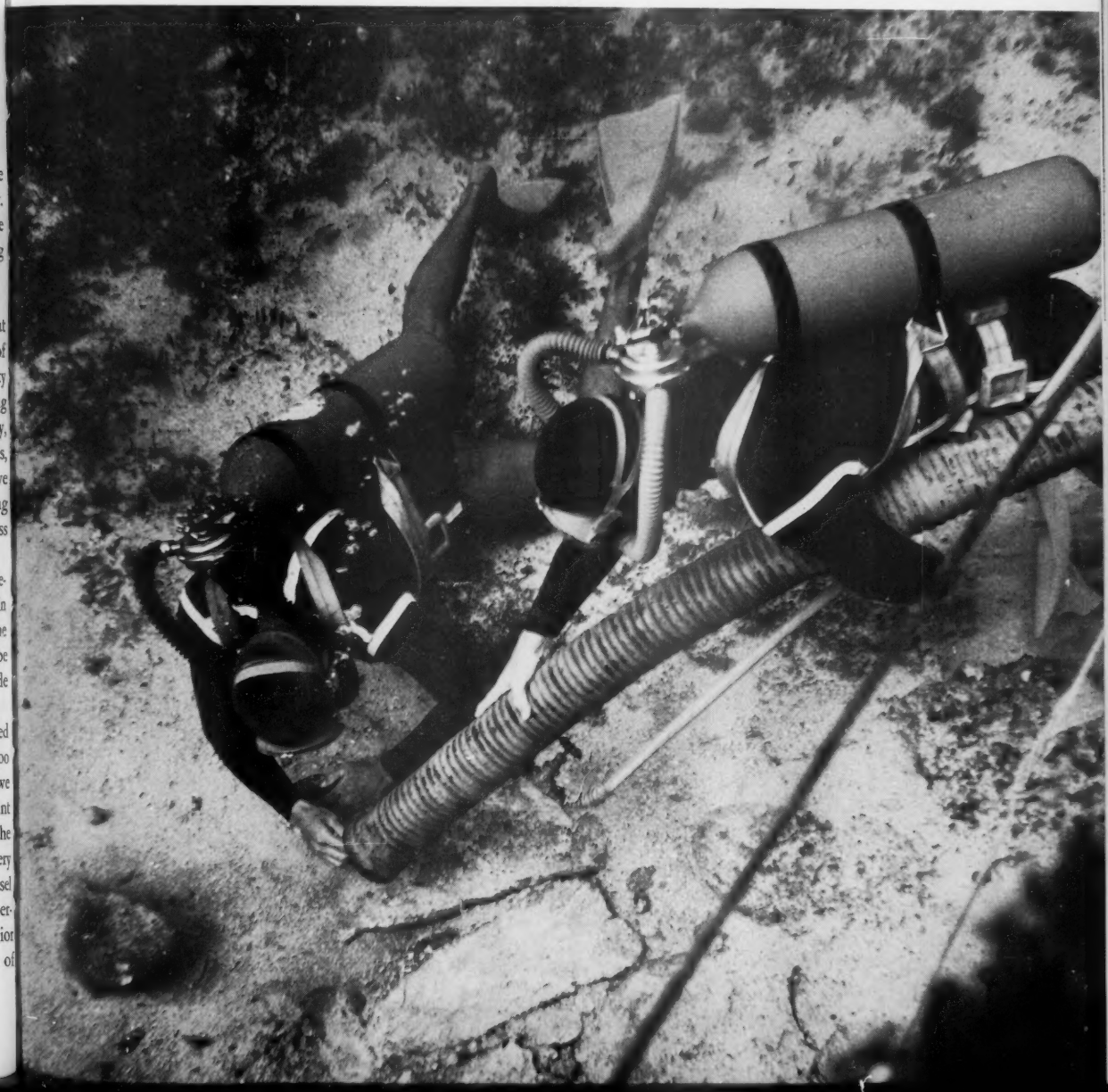
Pottery was more difficult to clean. The hard lime deposits, which usually separated from metal objects in flakes or large pieces, had seeped into the pores of the clay. Being harder than the pottery, it could not be broken away, and ordinary pottery-cleaning acids made barely a mark on this thick concretion.

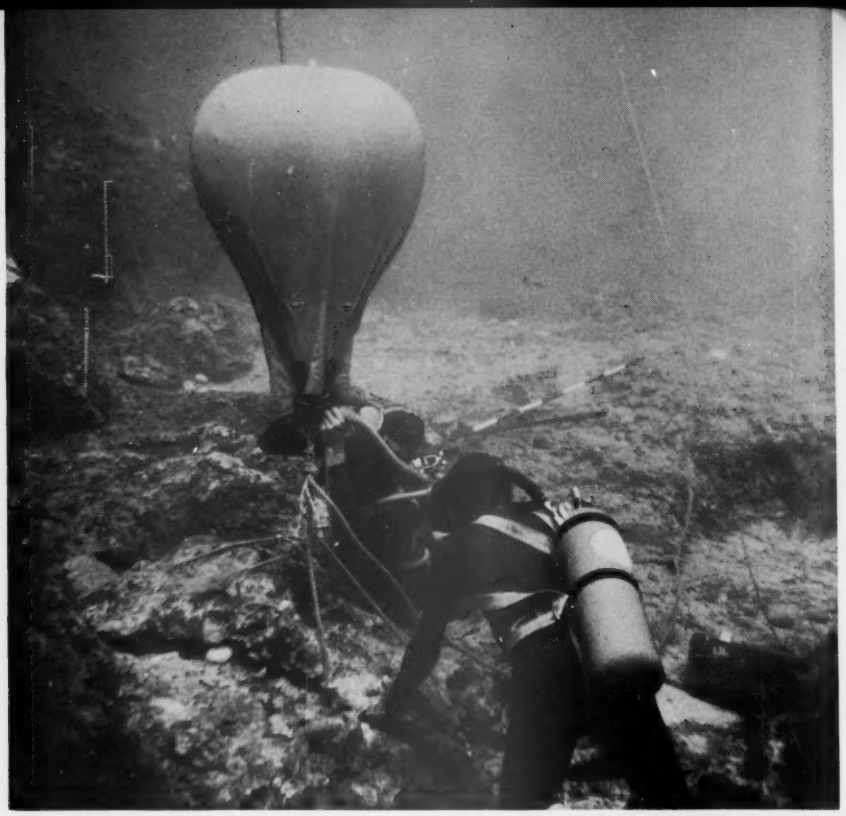
The portion of the hull which was preserved presented problems both under water and on land. It seemed too delicate to be excavated on the bottom; consequently we decided to raise all the wood in one lump. This meant cutting around and under the solid rock on which the wood lay, a job which took three weeks. All day, every day, divers went down in pairs, one holding a chisel and the other swinging a sledge-hammer. For hammering, the heavily weighted helmet divers were superior to free divers, even when we quadrupled the amount of

lead normally used on our weight belts. Once on land, some of the pieces of wood were preserved with a plastic coating. Others were stored in almost air-tight plastic bags which allow them to dry slowly without shrinking and warping. Neither method would be practical for large sections of a ship's hull, and new techniques must be developed to deal with such problems.

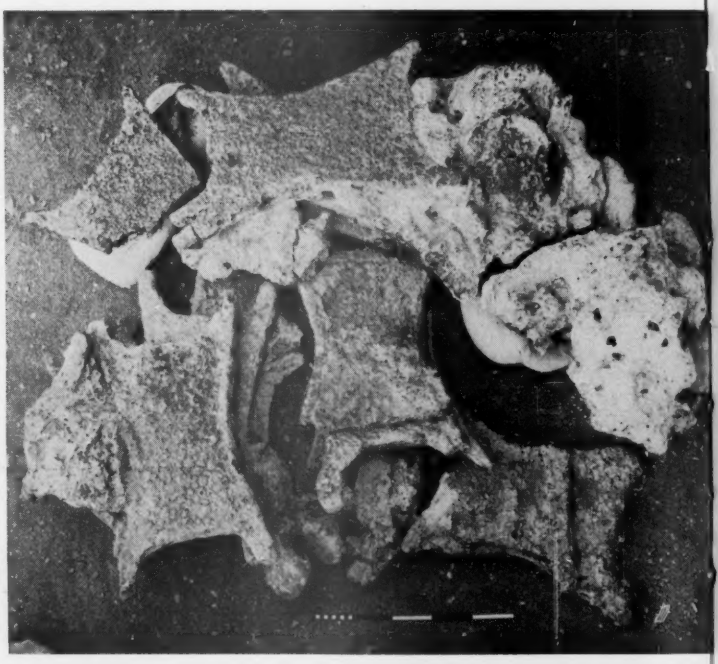
We searched for small objects inside the wreck by hand, raising the sand in buckets. It would have been impossible to raise all the surrounding sand in this manner, however, and for that job an air-lift was used—that is, a large, flexible tube to the lower end of which air is pumped through a hose. The air, rising through the tube, creates suction. The air-lift was never used to pick up sand directly for fear of breaking a fragile object. Instead, one diver searched the sand and gently fanned it to the mouth of the tube. We used two lifts. The larger one, six inches in diameter, carried the sand only forty-five feet away, where it was caught in a large bag tied to the upper end of the tube. Our smaller lift,

Two divers, wearing equipment donated by La Spirotechnique of France, clean sand from area **M** with an air-lift.

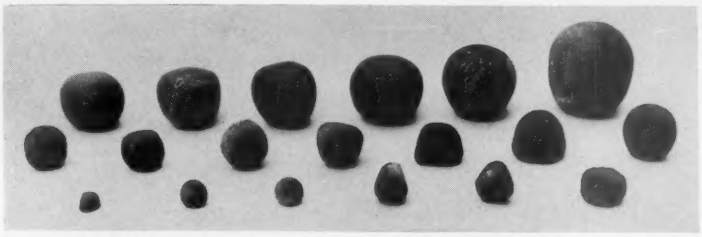




Above: **The lump containing ingots** 430, 432 and 433 was raised with a plastic balloon. The cliff is to be seen at the left. *Below, left:* Putting some of the lumps together at the camp on the beach. *Below, right:* The first group of lumps cleaned proved to be piles of ingots, still neatly stacked as they had been on the ship when it settled to the bottom. The two fragmentary ingots at the lower right are incorrectly placed in this picture.



In the concretion covering the ingots of area P was found this well preserved basket bottom. In it were metal scraps and broken tools.



Above, center: **Bronze double axe.** *Right:* Cylinder seal, probably from North Syria, showing two worshipers facing a deity who wears the *atef* crown. *Below:* One of three sets of weights of varying shape. The standard of this set has not been determined.

Shipwreck continued

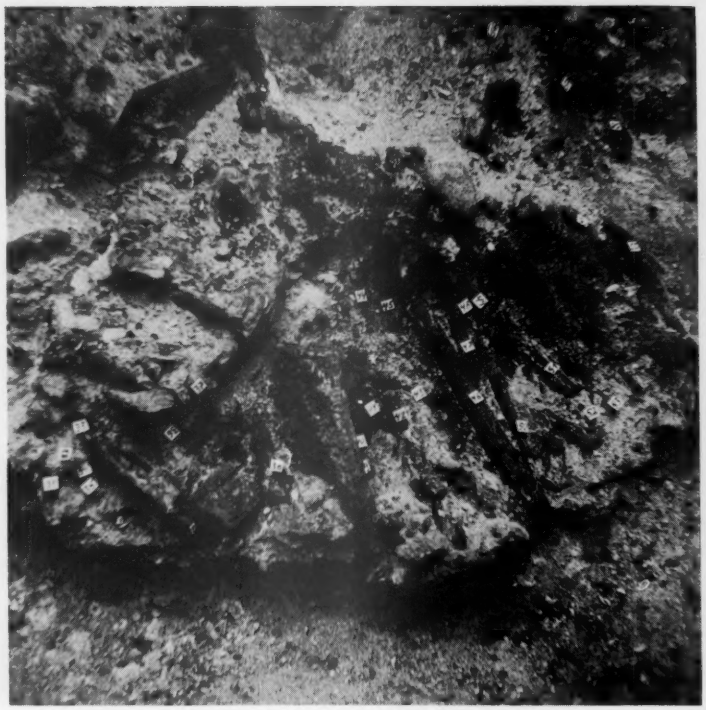
three inches in diameter and one hundred feet long, carried the sand onto the deck of the *Lutfi Gelil,* where it was dried and sifted.

Another searching device, brought by a *National Geographic* photographer who visited us for the last few days of the season, was an underwater metal detector. With it we located several deposits of metal that might otherwise have been missed, and assured ourselves that we did not overlook any of the metal cargo.

THESE WERE THE METHODS used at Cape Gelidonya. Other wrecks present other problems. Wrecks lying in mud are better preserved, but large quantities of mud have to be removed with air-lifts. To prevent the mud from flowing back into newly cleared areas, dams or walls may have to be built around them. Before the lifting can take place, the outlines of the wreck must be determined, perhaps with an underwater core-sampler such as that which we used in surveying the Byzantine wreck at Yassi Ada.

Much deeper wrecks will require new diving techniques. At the moment the most frustrating factor of underwater archaeology is time. Even if air supplies were limitless, a diver can work only a certain amount of time at any given depth. Otherwise pressurized nitrogen builds up in the blood and, turning into bubbles as the diver

Right: **Pieces of wood** were pinned with plastic labels. A few plank ends are visible, but most of this wood formed a pile of sticks which probably cushioned the thin hull from the weight of the heavy metal cargo.



Below: **Claude Duthuit** begins to free a concreted lump of metal from the seabed. The underwater watch allowed him to time his dives, although signals were given from the surface to warn divers.

Below, Right: **Rasim Diwanli** drives our core-sampler into the mud at Yassi Ada, where a Byzantine wreck is located.

Captain Kemal and his helmeted sponge-divers occasionally worked with us on the bottom, but this was only for the heaviest work. Usually their heavily leaded feet were a danger to fragile objects, and they lacked the mobility of free divers.

Shipwreck continued

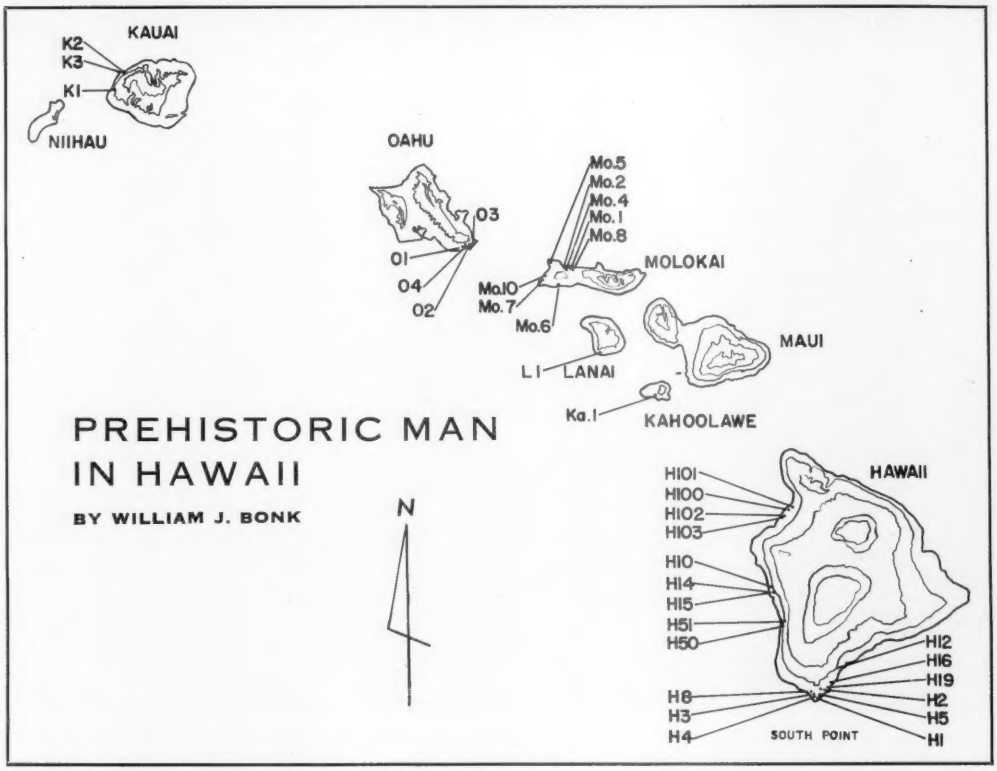
ascends, causes the crippling and often fatal diver's disease known as the bends. Bends killed one diver at Anticythera and crippled two others. One diver was killed at Artemisium. These accidents occurred because the sponge-divers did not understand the use of decompression tables. At Gelidonya we minimized the danger to divers by using the latest Navy diving tables, which were furnished by M. Dumas. At ninety-odd feet it was practical for each excavator to dive for only forty minutes in the morning, stopping for six minutes just ten feet beneath the surface before coming out of the water. This stop allowed some of the compressed nitrogen to leave his body. After a wait of at least three hours, it was possible to dive again, but this time for only twenty-eight minutes, with a six-minute stop.

There is much to be done in underwater archaeology. Two or possibly three other Bronze Age wrecks are known in the Mediterranean, although their relocation may not be easy. Last summer pottery was dragged up from a sixth-century B.C. wreck off the Turkish coast. Roman and Byzantine wrecks are known in the area. And somewhere there must be an Iron Age wreck and a Neolithic wreck. The evidence these hold will be invaluable and perhaps revolutionary for the study of civilization in the Mediterranean. More diving archaeologists and archaeological photographers and draftsmen will be needed. New techniques of locating and preserving ancient materials must be found. Land archaeology has passed safely through the stage of plundering and treasure hunting. Underwater archaeology must quickly follow its example.

GEORGE BASS is a research assistant at the University Museum, University of Pennsylvania. He received the M.A. from Johns Hopkins University and spent two years at the American School of Classical Studies in Athens. He has been a member of the excavation staff at Lerna as well as at Gordion.

Peter Throckmorton, technical adviser to the expedition, studied at the University of Hawaii, Mexico City College and the Sorbonne, and excavated in Japan. He has experience, both military and civilian, as a marine engineer. Now a photographer and writer, he is working on a book about the sponge-divers of Bodrum, Turkey.

In addition to the institutions mentioned in the article, the expedition was sponsored by the Council of Underwater Archeology, the Littauer Foundation and the American Philosophical Society, as well as by individual contributors.

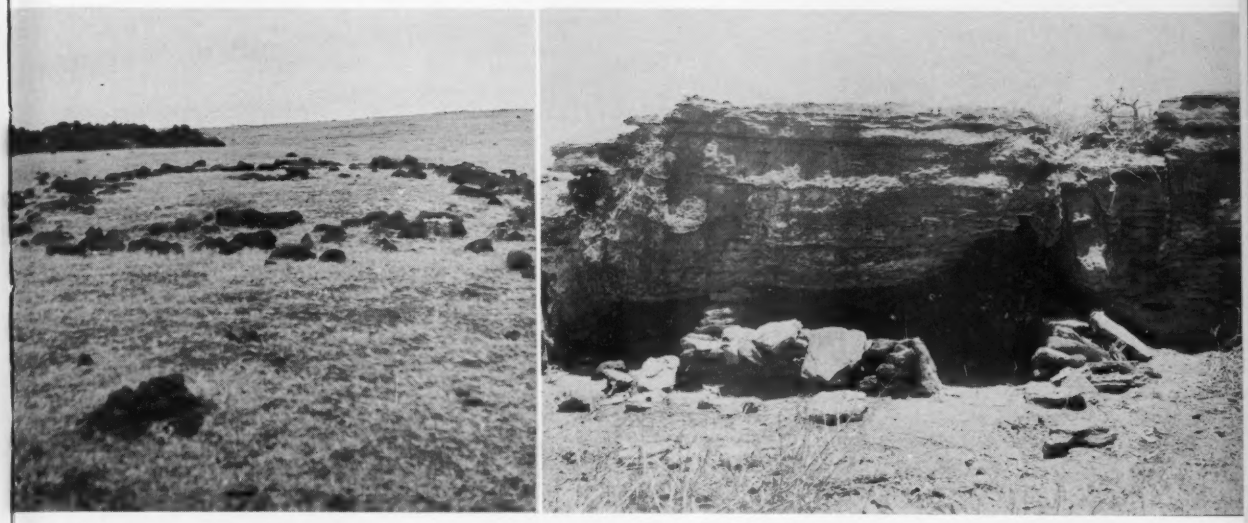


MAP OF THE HAWAIIAN ISLANDS, SHOWING THE LOCATION OF SOME OF THE ARCHAEOLOGICAL SITES.

HAWAII, the island archipelago in the north Pacific known today for its sugar cane, pineapples and Waikiki beaches, has often been thought of as a "paradise of the Pacific." This conception, intensified by the passage of time, has resulted in romantic notions about the early inhabitants and culture of the Hawaiian Islands as well as other areas of Oceania. To counteract these ideas, various educational and scientific institutions and organizations have for many years been attempting a systematic examination of the area, the people and the cultures that make up the Pacific region. But the name of one institution stands out as a leading force in the scientific study of man in the Pacific. This is the Bernice P. Bishop Museum of Honolulu.

The Bishop Museum was founded in 1889 as a memorial to Bernice Pauahi Bishop, the last member of the royal line of Kamehameha, aboriginal ruling family of Hawaii. Over the past seventy years the museum has sponsored numerous scientific expeditions that have traveled to many areas of the Pacific. From the data collected by these expeditions have come an increase of our knowledge and an added insight into the lives and habitat of the peoples of the Pacific region.

Not a small part of the research has been in the field of archaeology. For many years this consisted primarily of surface surveys, but the past decade has ushered in a new era with respect to Hawaiian archaeology. Systematic excavation, sponsored by the Bishop Museum and the University of Hawaii, commenced on the island of Oahu in 1950, and since then steady progress has been made toward achieving a program designed to be the basis for future work in Hawaii and the Pacific. Extensive excavations have now been carried out on most of the major islands in Hawaii. The main aim of this archaeological program, in attempting to cover the full range of islands in the chain, is to reconstruct the prehistory of Hawaii.

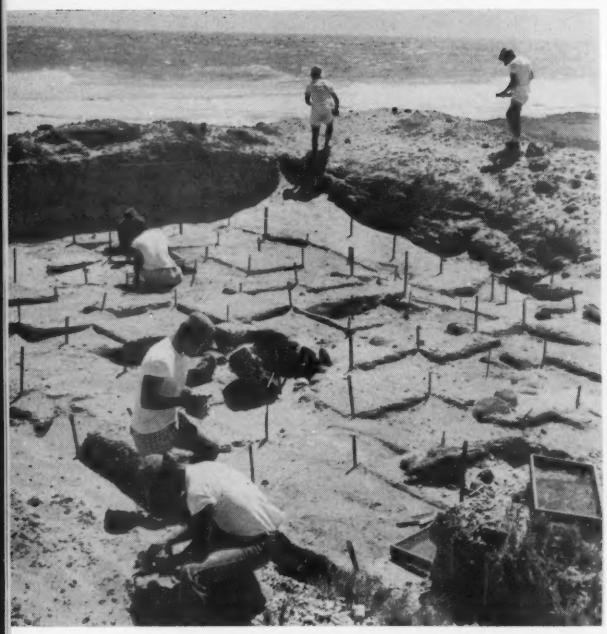


Left: **A house site** marked by a leveled area and paved with coral pebbles. A rough rectangular outline can be seen, bounded by a number of stones which at one time must have walled in the area. *Right:* A shelter site on Molokai (Mo3). It consists of a natural outcropping of sandstone which is partially walled in with flat sandstone slabs.

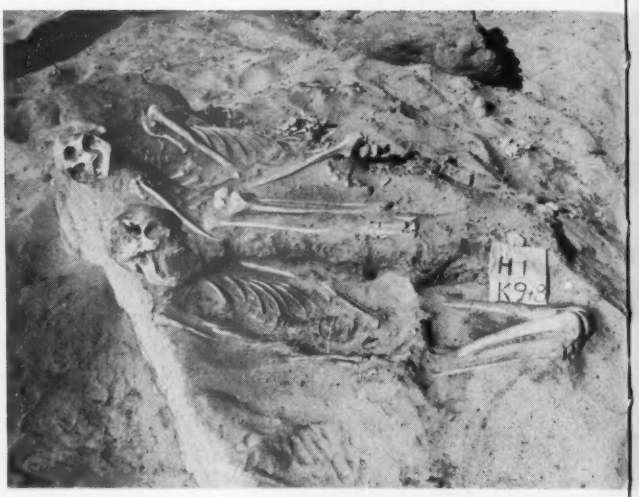
This means that we first have to determine how early a given island or district was originally inhabited, and that secondly we must trace the development of a chronological sequence from the first habitation to the known historic period. Eventually we hope to relate the gradually unfolding prehistory of Hawaii to the prehistory of other areas in or bordering on the Pacific Ocean. When that knowledge is attained, we shall have a far better picture of man's development and movements in Oceania.

To date, sixty Hawaiian sites have been examined and are recorded in our files. Most of these have had at least a test excavation, to see what they might yield. Some of them are camp sites or remains of house platforms or structures, others are rock shelters found beneath overhanging bluffs or in lava tube or bubble caves (types of caves formed during volcanic activity, when the liquid core of a lava flow continues to bubble and move within an outer crust which has solidified), and still others are burials or stone quarries. Less than a dozen of these sites had sufficient depth of soil and debris to allow a time sequence to be established.

OUR FIRST EXCAVATION, in 1950, took place in a bluff shelter on the island of Oahu. It proved to be extremely profitable. A fairly deep deposit of debris-bearing soil yielded faunal and floral remains, a goodly number of artifacts made of bone, shell and stone, and perhaps one of the most significant discoveries, found in the lowest cultural level—a handful of charcoal weighing one and a half ounces. This amount was sufficient for analysis and dating by the then newly developed radiocarbon technique. The following year we received from it our first date for Hawaii (and the Pacific)—A.D. 1004 $\pm$ 180 years. This was a milestone in Hawaiian archaeology. From that point on we were in a position to date sites in an accurate manner. The next step was to gather a suffi-

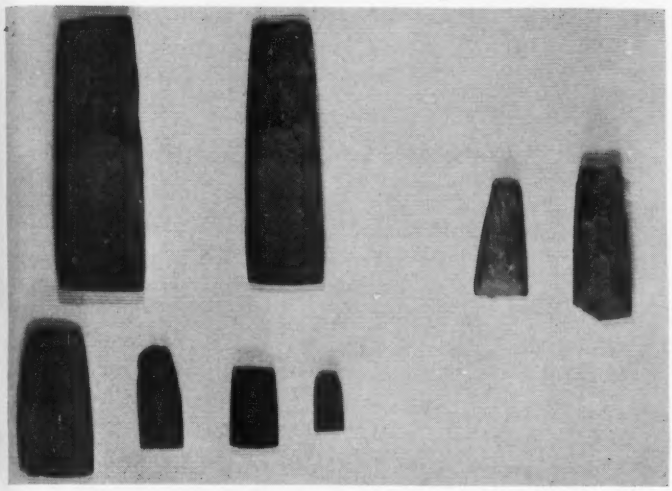


Our largest, most productive and oldest site on Hawaii (H1). This site was a fishermen's establishment that dates as far back as A.D. 124.



A double burial at the South Point sand dune site, Puu Alii (H1). Many sand burials were uncovered in the dune which lies above the major cultural portion of the site.

Fishermen still make use of this area of Molokai. This is a well protected shelter site (Mo1) adjacent to a beach and good fishing.



Black basalt adzes. The two specimens illustrated at the right are triangular in cross-section. These are therefore quite different from the common quadrangular form represented by the six specimens shown at the left.

HAWAII continued

cient quantity of artifacts at a number of stratified sites, and at the same time to continue the accumulation of Carbon 14 dates. The excavation of a large number of artifacts would enable us to examine the data quantitatively so as to reveal the culturally significant elements as well as the unique ones.

During the next seven years we continued excavating on Oahu and also established field stations on Molokai, Hawaii and Kauai. Most of the actual digging was accomplished during the summer months, vacation periods and weekends, when students as well as instructors were available for the often long and difficult trip to and from the site.

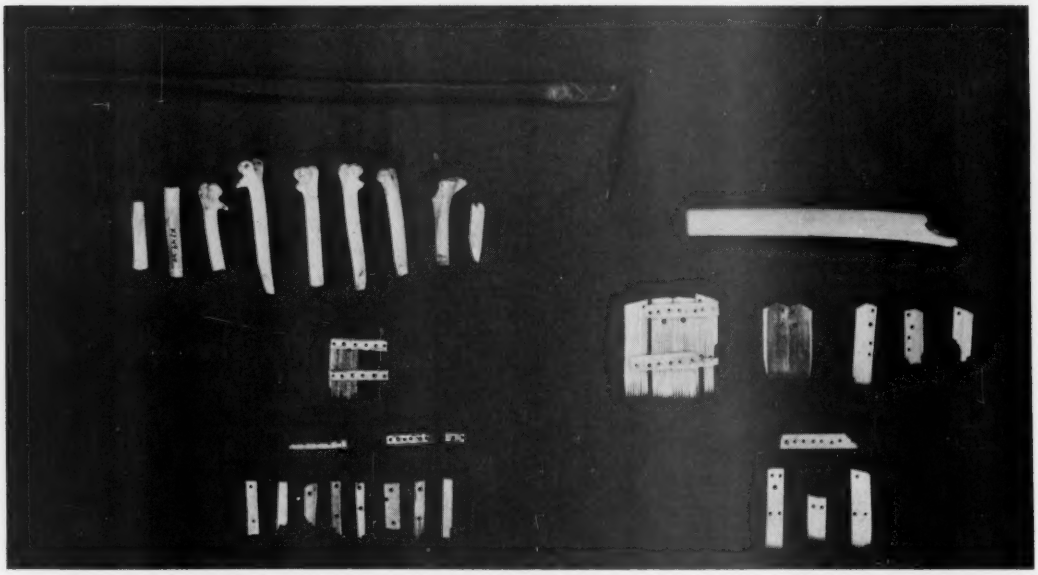
Almost always the sites are close to the sea and show a cultural orientation in that direction. From the excavations we have gradually accumulated significant quantities of fishhooks, tools and materials used in fashioning them, stone sinkers, animal bones, sea shells, awls, needles, picks, adzes, ornaments and many other durable items. As this material is sorted, compared and analyzed, a more meaningful picture of prehistoric man in Hawaii is gradually taking form. A number of stone adzes have been uncovered at many of the sites. Typically, these are quadrangular in cross-section and are very much like the known Hawaiian specimens which are so numerous in museums and private collections. However, two triangular adzes of a type found in early nineteenth-century Tahiti have also been excavated, one of them from a very early cultural level. Tattooing is known to have been practised in the islands prior to the coming of foreigners but none of the grooved bird-bone needles that were used in the actual skin-piercing process had been found until the recent excavations. Some differences in the forms of these needles are noted among the islands. Ornaments of various kinds were used, such as beads, bracelets and pendants of many shapes and sizes. But again new and heretofore unknown types and forms are constantly coming to our attention.

THREE SITES OF MAJOR IMPORTANCE at the most south-

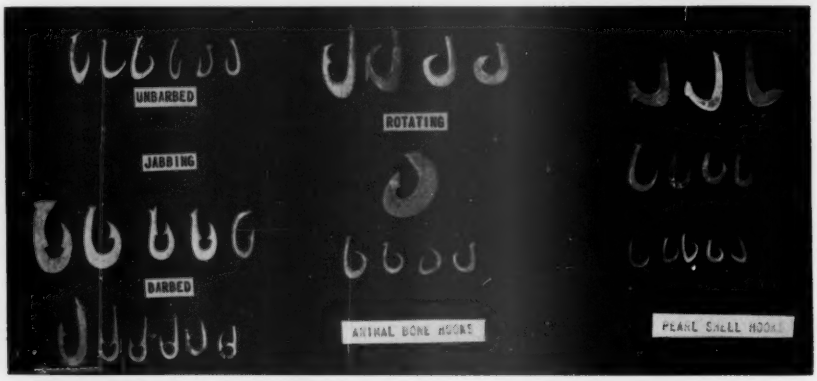
A NATIVE of New York, William J. Bonk has long been a resident of Hawaii, where he is Instructor in Anthropology and Sociology at the University of Hawaii, Hilo. He holds the B.A. and M.A. degrees (1951, 1954) from that university, and is at present pursuing further graduate work at the University of Illinois.

Mr. Bonk has conducted numerous excavations for the Bernice P. Bishop Museum, of which he is Honorary Associate, and in collaboration with the Director, Dr. Kenneth P. Emory, and Y. H. Sinoto, has published a monograph on Hawaiian fishhooks (1959).

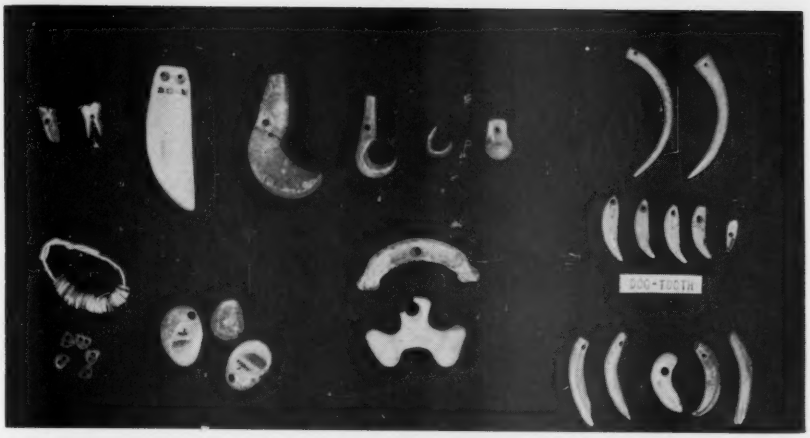
ern extremity of the island of Hawaii allowed for a study of time change in artifact type. For this the cultural time indicator is not pottery, arrowheads or blades of one sort or another, but fishhooks. These hooks took on more than normal significance when we became aware of the large number that were being recovered in all of our major excavations at every level. At once it became clear that fishing had always been important in the prehistoric Hawaiian economy. However, a closer check revealed some interesting space and time differences in fishhook types. It soon became apparent that a fishhook typology could be established, and when once this was accomplished we set to work sorting all of the available hooks according to the established types. A key-sort card system allowed for the rapid sorting of over three thousand hooks that came from our three primary South Point sites, H1, H2 and H8. We were now ready to examine and compare the hooks found in various cultural levels within a site not only with each other but with those found at other sites. When this was done we noticed that



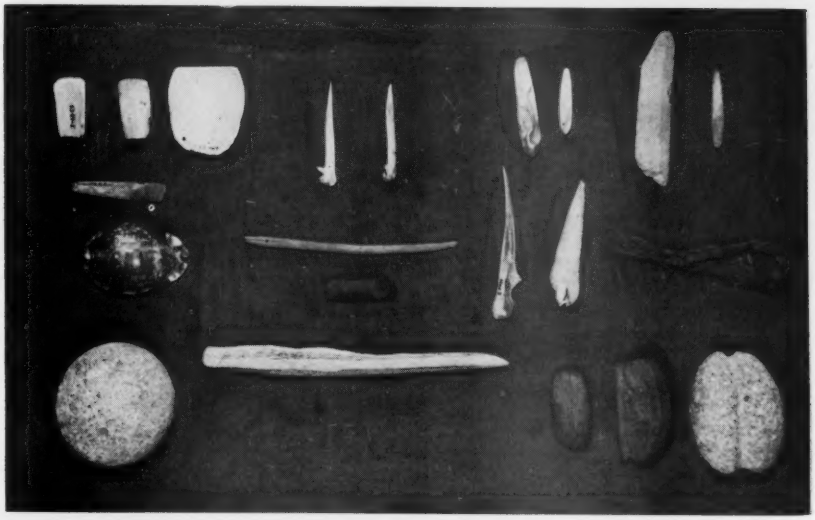
Tattooing needles. *Lower left:* examples from Hawaii; *lower right:* from Oahu; *middle left:* from Kauai. At upper left is shown the method of hafting to a wooden handle. *Upper right:* section of bird bone from which the needle combs were cut.



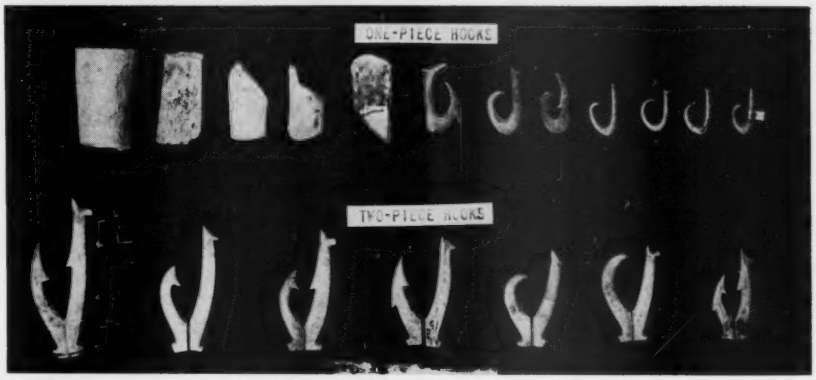
Various types of one-piece fishhooks, made of bone and pearl shell.



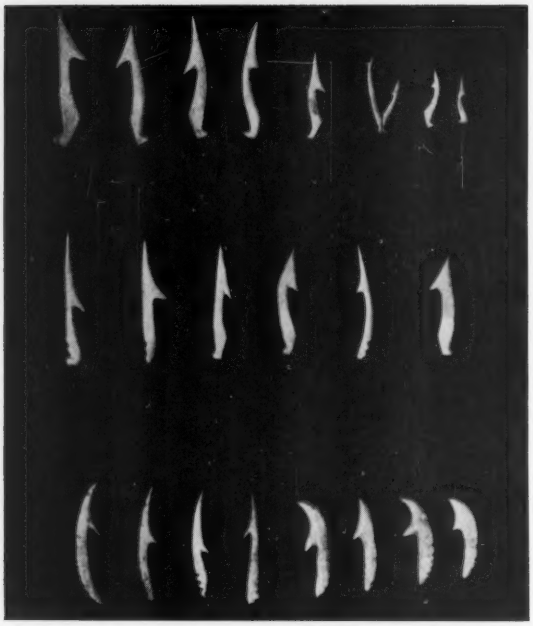
Various ornaments. Pendants, beads and bracelet plates are shown.



Examples of various artifacts: shell scrapers and adzes, bone picks and awls, needles, lures and sinkers, chisels, files, game stones, bottle stoppers and cordage.



Cache of fishhooks from Hawaii. Stages of manufacture and variations in form are shown.



Relative chronology of two-piece fishhook points from South Point, Hawaii. *Bottom row:* Notched-point period (A.D. 124-1230); *middle row:* Transitional period (1230-1700); *top row:* Knobbed-point period (1700-1800).

HAWAII continued

site H1 produced a large number of base-notched points belonging to two-piece fishhooks but only three knobbed points, and that the latter were limited to the latest period. In contrast, the opposite was true at site H2, where there were many knobbed points but only two notched points. Our third site, H8, was transitional between the other two: the upper levels contained a large number of knobbed points and few notched points, whereas the lower levels showed a much greater incidence of notched than of knobbed specimens. A truly interesting fishhook chronology was established when radiocarbon dates for these sites became available. Our oldest carbon sample, from the bottom stratum of H1, was dated at A.D. 124 ± 60; however, recent information from the laboratory analyzing this sample may now revise this date to A.D. 280 ± 160. The early cultural period of H8 is dated at A.D. 957, and its middle period at 1230. Site H2 seems to have started its development around the year 1650. Site H8 is of prime importance, for it bridges the gap between the other two sites. It is transitional in time as well as in fishhook types. Site H1 is the oldest of the three sites and its hooks, such as the notched points, are likewise older. The cultural history of H1 is cut off after a time, as we see that the site was abandoned before the typical knobbed points characteristic of H2 had been developed.

Many other significant facts can be deduced and elaborated upon, but suffice it to say that the general picture of prehistoric man in Hawaii, as it is now developing, shows a stable, slowly changing culture, marked by cultural periods which are determined by distinctive fishhook types. At this time the evidence does not seem to confirm any of the multiple migration theories that were once so popular. With further exploration in Hawaii as well as in other key areas of the Pacific such as Tahiti, where work is now going on, we shall gradually fill in the blank pages in the cultural history of this important but still unknown part of the world.

Highlights of the AUTUMN issue of

ARCHAEOLOGY

THE FRIEZE OF THE HOUSE OF MELEAGER AT POMPEII
by Halsted B. VanderPoel

THREE CAMPAIGNS AT BIBLICAL SHECHEM
by James F. Ross and Lawrence E. Toombs

EPHESUS: PAST, PRESENT AND FUTURE OF AN ANCIENT METROPOLIS
by Alfons Wotschitzky

TWO SHAMAN GRAVES IN CENTRAL AMERICA
by Wolfgang Haberland

1. Portion of a complete spike of Mummy wheat (Emmer) from a VIth Dynasty tomb (ca. 2300 B.C.) in the Step Pyramid at Saqqara, Egypt. 4 diameters.

Studying the Diet Of Ancient Man

By Hans Helbaek

ARCHAEOLOGY IS THE STUDY of ancient cultures; it is concerned with the history of man and his achievements. The archaeologist is not content, however, with pointing out what man achieved, but to an increasing degree is concerned with the natural conditions required for these results. What were the surroundings in which ancient man created his artifacts and his monuments, where did the materials come from, how did his activities influence his environment and what were his means of subsistence? Answering such questions was not always within the scope of the general archaeologist of the old school. The material required for illuminating many of these problems is perishable, and it may be of a category which in the past was not even noticed during excavation. Furthermore, most of it belongs to the field of natural history and must be evaluated, or even excavated, by people with training in natural sciences. Thus the background of the present-day archaeologist need not necessarily be history, architecture or art history, but may often be botany, geology, zoology or chemistry. Only a team of specialists has any reasonable chance of coping with the questions asked today.

In the Neolithic period several grains were cultivated which are unknown to the modern farmer, for instance Naked barley, Einkorn and Emmer wheat. This is common knowledge, for it is in the books. But how did the authors know? Grain is perishable, it either sprouts or decays, it can keep for thousands of years only in a desert environment. What is the material basis for the statements we read—descriptions of plants which died many thousand years ago and which were the indispensable basis for the existence of ancient cultures?

In museum cases we see cultural remains made of imperishable materials, but apart from wooden objects vegetable matter is but little represented. In many museums no vegetable food is exhibited, and the visitor has little opportunity to form an opinion of the basis for statements concerning prehistoric plant food. Therefore we shall take him into the laboratory and, so to speak, place him at the microscope. He will walk through ancient fields all over the Old World, where wheat and barley were the requirements for human existence. He will discover that the material is abundant, although some of it may seem remote and intangible.

Some kinds of material occur everywhere; others are limited to certain climatic regions. Thus mummy wheat is found only in Egypt, while the Iron Age corpses which have been found in bogs (whose stomach content is a valuable source of information on diet) are encountered only within a restricted area of northwestern Europe. Silica skeletons are commonest in the Near East, while the two most important categories, carbonized grain and seeds and their imprints, may be met with all over the world except in the Arctic regions.

The results of this specialized study make a long story which was touched upon in a previous article (ARCHAEOLOGY 12 [1959] 183-189); here it is proposed mainly to give an idea of the evidence and the technique by which these results are arrived at.

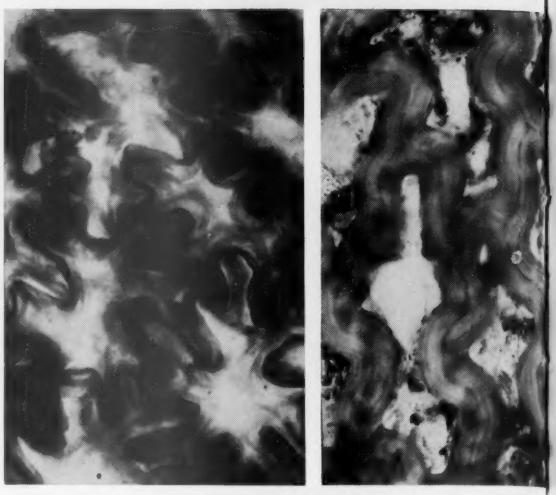
THE SO-CALLED MUMMIFIED GRAIN from Egyptian tombs is the nearest we can get to the original state of the food plants of antiquity. Because of the severe aridity, agriculture in Egypt is wholly dependent upon irrigation, either from small wells or by the distribution of the Nile waters through canals in the low-lying lands in the

Delta and farther up along the river. In the galleries beneath the pyramids, as well as in pits in the open desert, stores of grain may be found which have kept almost completely fresh as long as five or six thousand years. The husk may be a little darker than that of contemporary grain (it will oxidize like wood) but all the details—the tiny hairs on kernels, husks and internodes, etc.—are still there, and the cell structure is easily discernible. Even the starch will still react to the iodine test and stain a deep violet. Figure 1 gives an impression of the excellent state in which mummy wheat may be preserved.

It may be well to point out that the common belief that mummy wheat is still viable is unfounded. Even in its dormant state a seed must breathe, and for this purpose moisture is necessary. Thus the complete desiccation which is the reason for the grain's preservation is the very instrument by which it was killed a long time ago. Although the microscope reveals the normal pattern of the cells in the grain shell (seed case), numerous ruptures disturb the rhythm in this vital protective organ. A few years after deposition the grain died from desiccation, and no superstition can revive it. The belief in mummy wheat's viability is more than usually stubborn because it is supported by the tales of Egyptian guides who repeat it to visitors from all over the world. Incidentally, this particular species has not been grown in Egypt since Roman times, and nowhere can an authentic example of live progeny of genuine mummy wheat be demonstrated. However, before it became extinct in Egypt it was taken to Ethiopia, where it has been grown ever since under the name of Adaz. Other races of the same species are grown in remote mountainous districts in Europe and elsewhere. In the Germanic languages it is called Emmer.

Even though wheat alone is reputed to be immortal, barley was also an important grain in ancient Egypt, used for bread and beer alike. Many other plants were cultivated, especially a number of species of the pea family, but they still grow in Egypt and do not cause exaggerated speculation.

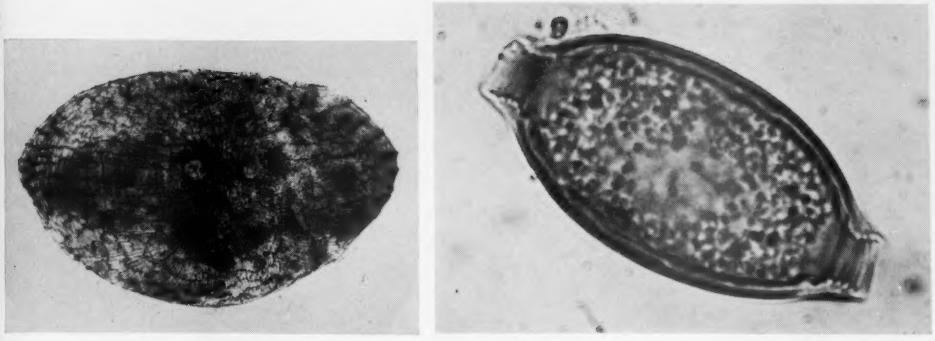
A COMBINATION OF MOISTURE AND OXYGEN is a prerequisite for the activity of putrefactive microbes. In Egypt there is too little moisture, hence the plants may keep forever; in peat bogs, on the other hand, we find many categories of vegetable matter preserved because no fresh air is available and also because of the long-term action of humic acid. These circumstances afford unlimited material for the study of the history of vegetation, both in the form of wood, leaf and fruit samples, and in the form of pollen. As for the study of plant husbandry and human diet in the past, the possibilities are somewhat limited: starch is not preserved and even such plant parts as husks and grain shells are rarely reported from peat analyses. However, many seeds and fruits have such tough shells that they will never disappear unless the bog dries up.



2. *Left:* The stellate epidermis cells in the seed coat of corn spurrey from the stomach of the Iron Age man from Grauballe, Denmark. 500 diameters. 3. *Right:* Seed coat epidermis of black nightshade, from Grauballe Man. 500 diameters.

In excavating prehistoric marsh dwelling-sites in the foothills of the Alps, large deposits of berry stones and seed may be met with which have preserved their shape and sometimes even their characteristic colors. Most often they come from juicy and more or less sugary fruits: this is the refuse from wine-making. As early as 2000 B.C. people had discovered how to make attractive drinks from wild berries growing on the lower slopes of the Alps. They used mainly wild grapes, blackberries, raspberries, elderberries, the fruits of the bittersweet nightshade and the Cornelian cherry, which is very common in the open forests of the southern foothills, and which in certain parts of northern Italy is still collected for the same purpose. Some authors have suggested that these accumulations of berry pits are human excrement, but this supposition is contradicted by the massive amounts of Cornelian cherry stones found; these are as long as 1.5 cm. and would be pretty awkward for eating on a large scale.

In northern Holland, northwestern Germany and the Danish peninsula human corpses of Iron Age date are



4. *Left:* A whole seed, showing the intricate cell structure of thyme-leaved speedwell, from Grauballe Man. 65 diameters. 5. *Right:* Egg of one of the many intestinal worms which infested Grauballe Man two thousand years ago. 1650 diameters.

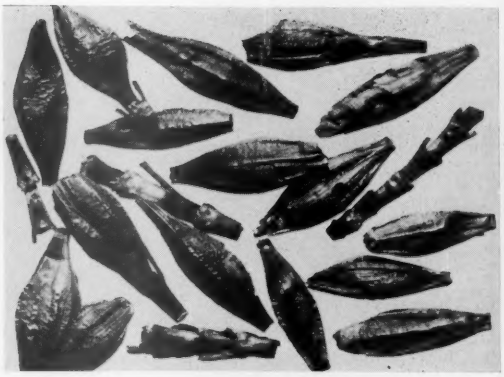
sometimes found in peat deposits. Peat is known to have been used for fuel since the Neolithic period, and these corpses seem to have been thrown into small ponds left by peat-cutters some two thousand years ago. The corpses from Tollund and Grauballe have received particularly widespread publicity.

The conditions for preservation of vegetable matter seem different if it is enclosed in the intestinal canal; it is, at any rate, a fact that husks and seeds of grass removed from the alimentary tracts of corpses found in bogs are often quite extraordinarily well preserved. Thus starch may keep its specific grain structure and the ability to stain with iodine, while husks may retain their otherwise perishable surface (epidermis). Many fragments of the inner integument (seed coat) of cultivated grains may be encountered, and even the protein cells, which would not seem to be very resistant, may still cover the inner surface of the seed coat. These transparent pellicles are identified in part by their specific cell formations, in part by the microscopic hairs which may still be attached to fragments of seed coat. The hairs from the grains of wheat, barley, rye and oats vary and are of good diagnostic value.

Sometimes many whole seeds and fruits are found in the remnants of a meal, especially those which have a strong shell and have escaped grinding and chewing. Fruits of willow weed and goosefoot made up considerable proportions of the bog men's meals; many are intact and macroscopically determinable. Apart from these, the intestinal contents consist of a mud-like matter, and from this particles are selected by low magnification for examination under a high-power microscope. Very small fragments may suffice for identification, in some cases half a square millimeter. When one looks at these mud particles, mounted and strapped under high-power lenses, an inexhaustible variety of shape and color meets the eye—sometimes fragments consisting of a series of layers of varying structure, or bits of a single layer of tissue with its cells clearly exposed to observation and measurement. Figures 2, 3 and 4 show characteristic examples of the amazing clarity of these old tissues.

The bog men subsisted on a highly mixed diet. The Grauballe Man, for instance, had in his intestinal tract the remains of sixty-six species of plants, only seven of which were cultivated. Various plant diseases have been identified, such as ergot and smut, and he himself was plagued by an intestinal worm whose eggs occur literally by the million (Figure 5). All the non-cultivated plants were species the seeds of which were collected on the fallow field, in the meadow and forest, and they tend to show that life on the basis of agriculture was anything but uncomplicated in those days, at least in that part of Denmark, which is mostly rather poor land. The Grauballe Man had, however, eaten some meat as well, to judge from small splinters of animal bones among the plant remains.

6. *Left:* Imprint of a spikelet fork of Emmer from a potsherd of the first phase of agriculture in Denmark, ca. 2500 B.C. 4 diameters. 7. *Right:* Spike of Einkorn, a unique specimen found in a Bronze Age marsh dwelling in northern Italy, ca. 3800 years old. 4 diameters.



8. Carbonized kernels and spike parts of two-row barley found in an Assyrian palace in Iraq. 4 diameters.

Ancient Man continued

CHARCOAL IS AN EXTREMELY DURABLE MATERIAL. If not exposed to high temperature or mechanical action it may remain determinable indefinitely, whether deposited under wet or dry conditions. The same applies to other forms of carbonized vegetable matter, and to the student of the dietary practice of the remote past this is of great value. Now and again one meets in the literature the expression "spontaneous carbonization" in connection with deposits of prehistoric grain. The term intimates that grain may turn into charcoal at ordinary temperatures if kept underground long enough. This is, in fact, an invention: carbonization requires heat, and deposition of grain would soon result in putrefaction and complete destruction unless the grain were heated beyond roasting point. In a cereal grain there is too little cellulose and too much easily decaying starch for the fermentation heat to turn it into charcoal. We may take it for granted that the carbonized food remains found in excavations have invariably been exposed to direct or indirect fire. It may have happened by accident or have been the consequence of miscarried parching.

From earliest times it was customary to parch grain, the purpose varying with the circumstances. The primitive wheat species, Einkorn, Emmer and Spelt, have a tough and sturdy spikelet which does not release the grains through ordinary threshing; the spikes are beaten to pieces but the grains are still enclosed in their individual husks. If, however, the spikes are heated, the solid portion of the spikelets (see Figure 6) becomes dry and brittle and then it is possible to crush them. Therefore grain parching was used wherever these three species were grown. Grain was also dried in cool and rainy regions, but here simply to store the harvest without risk of fungus attack and other damage, whatever species was involved. In hot and humid climates grain was dried to prevent ill-timed sprouting. Of course the seed grain for the next season had to be put aside and preserved by other means, since germinating power is destroyed by even a comparatively low temperature.

Our finds show clearly that proper temperature control was impossible in primitive drying plants, even in the comparatively sophisticated Roman kilns. Thus it often happened that the grain was overdone, scorched or wholly carbonized. Then it was thrown on the garbage heap and preserved forever. Where datable artifacts are found in the same strata, the grain constitutes most valuable study material. And by no means do we always find just small quantities; a pint is common, a gallon not unusual, and several finds of about ten gallons are mentioned in the annals of archaeology. Such large quantities come mostly from burned houses. Much useful information may be acquired, for instance, about the relative importance of the several grains and legumes and about the weed flora of the fields, items which may reveal the economic status of a prehistoric community and its contacts with the world abroad.

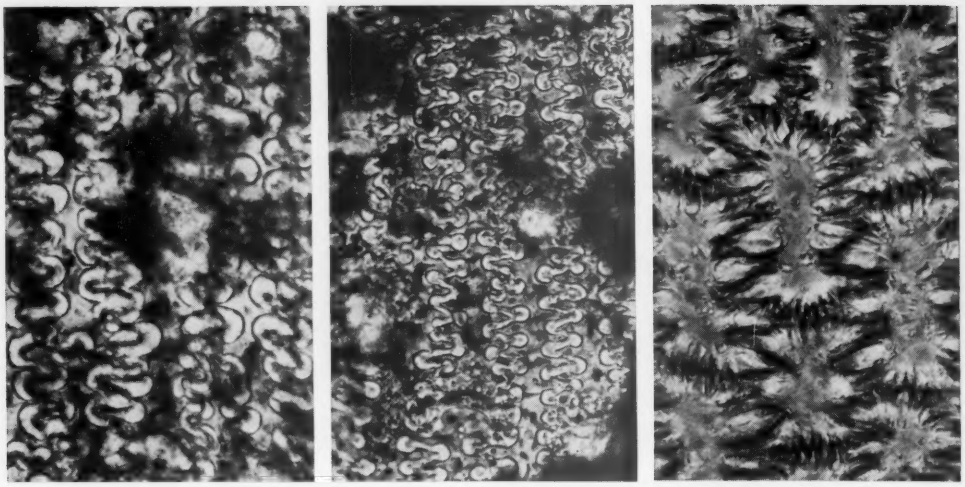
9. Portion of a carbonized heap of the oleaginous seeds of flax and gold-of-pleasure, from a burned Iron Age house in Denmark. The pear-shaped object on top of the seeds is the pod valve of gold-of-pleasure. 4 diameters.

Complete carbonization turns the kernel into an amorphous mass almost devoid of traces of cell structure; however, some kernels are imperfectly carbonized, and then it is possible to study the microscopic details of husks and grain shells. Even carrier tissue of starch bodies and the branching system of the fungi which attack the grain if left too long in wet condition may occasionally be observed. These exceptions are useful for the study of crushed remains of carbonized material, such as bread and buns. It is sometimes possible to find evidence of the species of grain and seeds from which buns are made which occur at Bronze Age sites in central and southern Europe. When plant matter carbonizes a lot of tar is formed, and this tar is actually the main obstacle to identification, as it is largely insoluble.

Carbonized grain is generally in a rather poor state as regards morphological detail, but now and again it comes through the process surprisingly unscathed. Not often do we get as fine evidence of the details of a Bronze Age spike as are given by the Einkorn spike from Lake Garda in Italy, depicted in Figure 7. Apart from awns, this unique specimen gives all the information we could wish for. Figure 8 shows a collection of grains and spike parts of two-row barley which got overheated in a pot in an Assyrian palace in northern Mesopotamia some twenty-six hundred years ago. The details are equally as good for determination of the exact spike form as in freshly harvested barley. The kernel may be precisely described: the wrinkling of the husks, the serration of the veins and the specific shape of the bases; and the internodes with the remains of the lateral florets permit a classification of the race. Only one problem eludes us: the color of the grain. A great variety of grain color is met with in areas beyond Europe—the kernels may be white, yellow, purple, violet, gray or black. Thus, for instance, in the country where this Assyrian barley was grown, modern barley is yellow or purplish black.

Although perhaps more prehistoric carbonized plant material is recovered in Denmark than in most other countries, only one specimen from that country is illustrated here. In order to explain the possibilities offered by excavated plant remains it is expedient to present the most instructive examples, and Danish material is often comparatively poorly preserved. During frost and thaw the soil particles move and slowly grind off the finer details of the fragile plant bodies. Even though most grain is found at some depth beneath the present surface, there was a time when it lay scattered on the ground before erosion and sand drift covered up the habitation site, and that is when the damage was done. One of the best available exceptions is shown in Figure 9. It is part of a large heap of linseed and seeds of a weed that grows with flax, called gold-of-pleasure, or false flax. In the Danish Iron Age the two plants were grown together, and both kinds of seed were used for food because of their considerable oil content. This deposit was found with other food remains in a house burned down in Jutland some time during the first century of our era. Also from this house came a large vessel filled with malt (sprouted barley), the only evidence for prehistoric brewing yet encountered in Denmark.

IN MOST EXCAVATIONS in arid zones, for instance in Egypt and Mesopotamia, one comes across heaps or extensive strata of ash. It is of course desirable to find out what the fuel was, since often it has a bearing upon the common vegetable food of the time. Usually the ash will prove to consist of an amorphous powder mixed with small bits of structurally highly organized glass matter. These fragments are the siliceous element of the epidermis of grasses. During its growth the epidermis cell of grasses and some other families undergoes "mineralization." The minute interstices of the fundamental cellulose framework of the cell wall are eventually filled with other organic substances as well as silica. When the plant burns or decays, this element of silica remains, and if the plant part is protected against mechanical action, as for instance in the wall of a clay vessel, it represents a true copy of the cells, exhibiting all their specific structural details. The difference in dimensions and design in the epidermis cells of the various grasses may be very pronounced, and thus it is possible to distinguish be-



10. *Left:* Silica skeleton of wheat husk (Emmer) from a fifth-millennium B.C. habitation site in southern Turkey. 675 diameters. **11.** *Center:* Silica skeleton of wild oat husk from the same site. 675 diameters. **12.** *Right:* Silica skeleton of millet chaff found in an Assyrian palace in Iraq which was sacked shortly before 600 B.C. 675 diameters.

Ancient Man continued

tween the cultivated species by means of these glass-like objects.

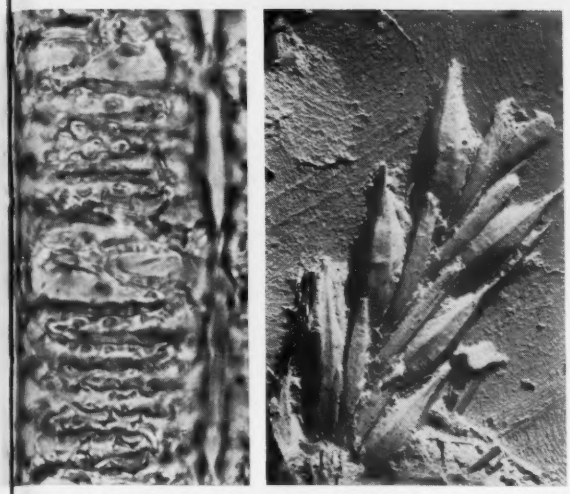
The skeletons of wheat and oat husks shown in Figures 10 and 11 were found by crushing Neolithic potsherds from Turkey. They remained well protected in the baked clay for more than six thousand years. As the pictures show, they are of distinctly different patterns. The attractive design of millet ash from an Assyrian palace is illustrated in Figure 12, and Figure 13 represents the complicated structure of a rice husk. A refuse dump in the northern Indus valley, well over two thousand years old, contained some white chalk-like layers which proved to consist mainly of ashes from straw and rice husk.

In areas in the Near East and elsewhere, where no suitable building stone is available and timber is an imported luxury, houses are built of clay or mud mixed with straw, stubble or chaff. This is the technique used ever since agriculture was invented and man settled down. When houses of this kind are excavated, the chunks of wall and floor material yield a multitude of imprints of plant parts, furnishing highly valuable information concerning the plants cultivated at the time when the house was built. Sometimes silica skeletons are also preserved, even though no fire was involved.

The pottery too, which was often made at the fireplace in the house, contains imprints because the food was prepared in the same place; hence grain and seeds spilled on the floor, adhered to the lumps of wet clay and were kneaded into it. Grain imprints occur in hand-made pottery from all agricultural regions of the world, and in Denmark they are particularly common. Bronze Age and Iron Age vessels of modest size may bear as many as two hundred imprints of seeds and grains.

If a dry seed is kneaded into wet clay during the shaping of a vessel, it absorbs moisture. At the same time it attracts the finest particles of the clay, which are filtered from the water by the seed shell and form a fine-grain coat all over the surface of the seed. When the vessel is fired the seed burns away, but the cavity left in the now hardened clay is lined with this fine-grain material in which minute morphological features of the plant body may be molded. A cast of the cavity will show the seed in sufficient detail for an exact description and identification. Even small seeds may in this way leave determinable traces, for instance, the seed of corn spurrey which is less than one millimeter in diameter.

As a rule large pieces of plants were picked off the clay by the potter, but in the big bricks of monumental Mesopotamian buildings one may come across more or less whole spikes. One of the finest examples of this kind is shown in Figure 14; here is all the detail necessary for a systematic classification of the type of two-row barley.



13. *Left:* The minute cell pattern of rice husk from an ash heap in the northern Indus valley, late first millennium B.C. 675 diameters. 14. *Right:* One of the most perfect imprints of grain ever encountered. Two-row barley from a brick which was used about A.D. 800 in building a huge weir on the ancient Nahrwan Canal east of Baghdad. 4 diameters.

Such bricks, which are upward from twelve inches square, may bear hundreds of determinable imprints of chaff and grains.

No carbonized grain from the time of the introduction of agriculture is known in Denmark, but a collection of potsherds has yielded most satisfactory information. Figure 6 is the imprint of a spikelet fork of Emmer, one of many imprints revealing the cultivation of Einkorn, Emmer, Club wheat and Naked barley, the earliest catalogue of cultivated plants known from Denmark. (Originally two grains were jammed firmly between the curved prongs of the spikelet fork, but this structure was rendered brittle by parching and the grains were released by threshing.)

Recently an attempt has been made to throw light on the evolution of agriculture in Iraq. It stands to reason that this country, which consists of a mountainous region in the north and a southern alluvial plain, is within the general area where agriculture originated. In the uplands the prototypes of the most important cultivated plants are still to be found, while the adjoining low-lying river plain would have been a natural area for developing the intensive irrigation which was the fundamental requirement for the rise of the vigorous Mesopotamian cultures. The project mentioned was carried out by a systematic tracing and determination of imprints in well dated pottery and bricks from ancient habitation sites, palaces and ziggurats, and also by the examination of carbonized material and ash from the area. Museums in England, Germany and Iraq were visited and the ruins of numerous ancient sites in Mesopotamia, from Nimrud and Babylon to Ur and Warka, were investigated from this point of view. The result is a quite coherent picture of plant husbandry extending from about the seventh millennium B.C. to about A.D. 800.

In the beginning man domesticated the wild Emmer and wild two-row barley of the northern mountains, and also cultivated wild flax. Presumably during the fifth millennium farmers migrated into the river plain with its fertile alluvial soil, and there eventually they developed irrigation agriculture. Through mutation two-row barley was transformed into the six-row form, while Emmer and flax attained a higher state of efficiency. General expansion during the fifth millennium brought agriculture to Egypt and even earlier to Asia Minor and eventually to Europe. It is, however, probable that expansion issued from several other centers in the Near East as well as from Iraq.

The small-grain wild wheat, Einkorn, which was domesticated together with the wild Emmer, attained a high state of development in Asia Minor and became the third member of the group of important grains which were taken to Europe and (presumably via the Danube basin) spread all over that continent in the course of a couple of thousand years. Flax and some of the Oriental legumes, such as peas, lentils and vetchling, accompanied the grains. Millet turns up in Mesopotamia about 3000 B.C., but the traces of that plant are not consistent in the Near East. While it was widely grown in southern Europe during the third and second millennia, in Iraq we do not encounter it again until about 500 B.C., and in ancient Egypt it does not seem to have been grown at all.

This field of research is but one of the many which comprise modern archaeology. If we aim to discover the whole truth regarding the life of our remote ancestors, this research is as indispensable as the interpretation of the more conspicuous remains of ancient cultures. And this applies to the corresponding fields within other natural sciences as well. The excavator must be informed and interested in these problems, and he must give considerable attention to the reclamation of the pertinent material. If he is alert, treasures of information may be acquired. The interpretation is comparatively simple; it requires only the prerequisites of all scientific research: special training, patience and luck.

SINCE THE PUBLICATION of his previous article in ARCHAEOLOGY ("How Farming Began in the Old World") Dr. Helbaek, palaeoethnobotanist of the National Museum of Denmark, has been on another extended trip to the Near and Middle East. Recently he was awarded an honorary degree by the University of Lund, Sweden.

Relief from the Treasury at Persepolis. The *hazarapat* in audience with Darius. Photo courtesy Oriental Institute, Chicago.

AN ACHAEMENID SCULPTURE IN CLEVELAND

By DOROTHY G. SHEPHERD

Curator of Textiles and Near Eastern Art, The Cleveland Museum of Art

THE HERO strangling the lion is one of the most ancient and persistent motives of Near Eastern art. In its earliest manifestation the lion strangler represented the hero protecting the sacred flock of the goddess of fertility. Gradually the orginal concept came to be replaced by a broader one in which the contest between man and beast "reflects," as Edith Porada has so well expressed it, "the eternal conflict in which Mesopotamian man saw himself as the defender of order and civilized life against the chaotic forces of nature." Eventually the concept of the "defender of order" was lost sight of and the contest of hero and beast came to be used as a symbol of power. This motif occurs in Persia at Persepolis, the great capital of the Achaemenid empire; the king himself is represented as the lion strangler.

The exquisite little lapis lazuli sculpture pictured here, a recent acquisition of The Cleveland Museum of Art (J. H. Wade Fund. 60.175), is certainly a similar manifestation of this ancient motif. It does not, however, represent an Achaemenid king but one of his subjects. Early in the first millennium B.C. the Medes and the Persians, kindred Iranian peoples, moved into Persia from the ancient Aryan homeland farther east. Toward the end of the eighth century B.C. the Medes established a kingdom which they quickly expanded into a great empire and finally, in 612, joining forces with the Babylonians, they succeeded in conquering the Assyrians. The Median empire, however, was short-lived, for in 550 Cyrus, son of a vassal Persian king and the daughter of the Median king, overthrew his grandfather and replaced Median

By courtesy of The Cleveland Museum of Art this article is reprinted in abridged form from the Museum Bulletin *(February 1961 issue).*

rule by that of the Persian house of Achaemenes. The Medes and Persians being essentially the same people, Cyrus' victory meant little more than the substitution of one royal house for another. Median and Persian nobles served the Achaemenid kings side by side.

In spite of their racial similarity and political equality, the Medes and the Persians were distinguished by their dress. Their tunics differed in design, and the Persians wore high crown-like headdresses while the Medians had soft, rounded caps, presumably of felt. It is this cap which identifies the Cleveland statuette as that of a Mede. Further explanation of the subject is less easy, however. In the Persepolis reliefs only the king appears in the symbolic representation of power. Does this sculpture represent a Median noble so powerful that he dared to have himself portrayed like a king? One can but guess that he may represent a governor of one of the empire's great satrapies, or possibly the commander of the "Immortals," the king's elite bodyguard.

The sculpture as it remains today represents the upper part of what may be presumed to have been a standing figure. The complete figure would have stood about 14½ inches high. It is carved from a single piece of lapis lazuli of a type characteristic of the famous mines of Badakshan, in modern Afghanistan, the source of all of the lapis lazuli used by the ancients.

It is difficult to judge for what purpose the sculpture was intended. Curious fractures on the shoulder and the back of the head clearly show a chisel mark at one point. This could indicate that the figure was part of some object from which it had been forcibly broken loose. On the other hand, the fact that the lion's paw protrudes behind the man's back makes it more likely that it was a free-standing figure and that the fractures are accidental.

Since we know that the religion of the Achaemenids did not utilize sculptures of gods or votive figures, we must assume that this was a purely ornamental piece. There are indications that such small-scale figurines were in vogue in Achaemenid times.

THE MUSEUM'S figure is truly monumental in concept and one feels that it was made by an artist accustomed to working in stone. The only comparative material for analysis of the style is found among the relief sculptures at Persepolis. A life-size figure of the *hazarapat,* or commander (illustrated here), shows the stylistic relationship of our sculpture to these reliefs. One is struck by the dignity and strength of these figures and by the simplicity of rendering. It is clear that the artists were in no way concerned with achieving realism but rather with an ideal, a symbol, or perhaps only a design which could be repeated endlessly without losing its strength. The lapis lazuli lion strangler exhibits exactly the same characteristics. Its elegant, simple stylization gives the figure an air of strength and dignity and makes it the symbol of the man's power rather than his portrait. This effect is further heightened by the contrast between the man's serene expression and that of the snarling lion.

In the technical treatment there is evidence that the sculptor was not experienced in working in three dimensions. In details such as the beautiful modeling of the hands and the "impressionistic" treatment of the garment the artist betrays his apprenticeship at Persepolis.

If nothing else had survived of this sculpture but the lion's head, there would be no trouble attributing it to Achaemenid Persia, whose artists were supreme as sculptors of animals. By means of simple, powerful lines and an exaggerated stylization of essential features, they succeeded in expressing the essence of the animal.

Unfortunately there is no clue to the sculpture's origin. Because of the similarity in scale to a group of small sculptures from Persepolis, one is tempted to see it as part of the same group. Another possibility is Hamadan, which lies atop the ancient city of Ecbatana, the summer capital of the Achaemenids. That it came from Persia we can be sure and, judging from its quality, it must be from one of the royal capitals.

The almost totally static character of Achaemenid art makes it impossible to attempt a precise dating. We do know that the most active and brilliant period of building at Persepolis lasted only a short time, perhaps sixty or seventy years. Because of the fine quality of the figure and its stylistic relationship to the Persepolis reliefs, there is every reason to consider it a product of this great period, at the very end of the reign of Darius (521-485 B.C.) or the time of Xerxes (485-466).

As the unique example of monumental figure sculpture in the round from the Achaemenid period, the importance of the Cleveland Museum's acquisition cannot be overemphasized.

1. Reverse of a bronze coin of Elis, struck in the time of Hadrian, which shows the head of the chryselephantine statue created by Phidias. Berlin Inv. 184/1936 (J. Liegle, *Der Zeus des Phidias* [Berlin 1952] Plate I). Shown slightly more than actual size.

A

C

B

The Olympian Zeus Before Phidias

By Willy Schwabacher

D

F

E

2. Bronze votive statuettes portraying Zeus striding forward, a thunderbolt held in his right hand, an eagle poised on his left. A. Olympia 3542. Ca. 520 B.C. (E. Kunze, *Neue Ausgrabungen in Olympia* [Berlin 1960] 303, figure 40). B. Athens, National Museum 6196. Ca. 500-490 B.C. (*Olympia* IV, plate 7, 46; C. Karouzos, *Archaiologikon Deltion* 1930-31, 562, figure 12). C. Athens, National Museum 14948. Ca. 490-480 B.C. From Ambracia, Epirus. (K. A. Rhomaios, *Deltion* 1920-21, 169-171, figures 3-6). D. Athens, National Museum 6195. Ca. 480-470 B.C. (*Olympia* IV, plate 7, 45; C. Karouzos, *Deltion* 1930-31, 59, figure 14). E. Olympia B800. Ca. 470-460 B.C. (E. Kunze, *IV. Olympiabericht* [1944] 134 ff., plates 51-53). F. Princeton Art Museum 37-343. Ca. 460 B.C. (G. W. Elderkin, *American Journal of Archaeology* 44 [1940] 225-233). Photo Princeton Art Museum.

WHEN THE STATUE of Zeus at Olympia is mentioned, most people think of the famous gold and ivory cult image created by the most celebrated of all ancient sculptors, Phidias, who flourished in the second half of the fifth century B.C. This colossal piece of statuary wrought in gold, ebony and ivory depicted the god enthroned, and was considered one of the Seven Wonders of the World. Today we would have little idea of the statue's appearance had not Pausanias, the second-century traveler, left on record a full and apparently accurate description (V.11). Until a few years ago virtually no trace of Phidias' greatest masterpiece had been found at the place where it once stood, and for a visual impression of the statue we are still dependent on a handful of Hadrianic and later bronze coins from Olympia. These afford us a fleeting glimpse in miniature of the work as a whole, while one among them (Figure 1) gives some idea of the majesty of the statue's head.

In the days of Pausanias one of the buildings within the sanctuary of Olympia was still known as "the workshop of Phidias." Some five years ago the excavators of the German Institute thoroughly investigated the site of this ruined building, about one hundred meters west of the great temple. They brought to light broken sculptor's tools, molds for golden drapery and bits of ivory, bone and glass. One of the most exciting incidents was the discovery of a little damaged vase. Scratched on the bottom, in well formed letters, was the inscription, "I belong to Phidias." (See ARCHAEOLOGY 12 [1959] 137). Here was welcome corroboration of the identification of

All coins shown at about one and one-half times actual size.

3. Stater of Elis, ca. 490 B.C. *Obverse:* eagle flying left, holding snake in beak; *reverse:* Zeus striding right, thunderbolt in right hand, eagle poised on left; inscription Ολυμπικον. Stockholm, Royal Coin Cabinet 26326.

4. *Right, above:* Stater of Elis, ca. 470 B.C. *Obverse:* eagle flying left, snake in beak; *reverse:* Zeus striding right with eagle and thunderbolt; inscription Ολυμπικον. Paris, Cabinet des Médailles, ex-Collection Photiades Pasha. *Below:* Stater of Elis, ca. 460 B.C. *Obverse:* eagle flying right, holding turtle; *reverse:* Zeus as before; inscription Ολυμπικον. Berlin, Staatliches Münzkabinett 374/1890.

Olympian Zeus continued

the site not simply as a sculptor's atelier but as that of the most famous artist of antiquity.

These discoveries, as well as unpublished results of other recent research in Olympia, have provided new and decisive evidence which enables us to answer still another of the riddles of the past. Exactly when did Phidias erect this great cult image in the worthy setting provided by the vast Temple of Zeus? There has been long and bitter controversy about this, but at last victory seems to go to those who favor what is called the "late dating." According to this theory Phidias did not go to Olympia until after he had completed his other masterpiece, the colossal chryselephantine statue of Athena which graced the Parthenon. We know for a fact that the Athena Parthenos was completed in the year 438 B.C. On this basis the Olympian Zeus cannot well be dated before 430, and it may even be a little later.

Acceptance of this theory has important consequences. The great Temple of Zeus was planned by the Elean architect Libon and was begun, as we know, around 470 B.C. It is certain that the building, with its magnificent sculptural adornment, was completed by about 457. This was more than twenty years before Phidias was to begin work on his masterpiece, perhaps thirty years before the great statue was finished. What did the interior of the cult room at Olympia look like before Phidias was summoned to create his colossal statue? The Temple of Zeus was one of the biggest and most lavishly decorated sanctuaries in the whole of the Peloponnesus. A temple was always—at least in Greece—the dwelling of a god, and the housing of a cult statue was the essence of its function. The ancient sources, however, are completely silent on this matter, and we are not given the least clue as to the contents of the sanctuary when it was first completed or during the quarter of a century which elapsed before Phidias came to Olympia. Is it likely, or even possible, that this splendid temple stood empty for so many years after its completion?

THE LITERARY SOURCES are silent, but archaeology can be called in to help us find a solution to the mystery.

5. *Above:* Stater of Elis, ca. 490 B.C. *Obverse:* eagle with snake (same die as Figure 3); *reverse:* running Nike holding wreath. Basel, private collection.

6. *Right:* Stater similar to that illustrated in Figure 5 (same obverse die as in Figures 3 and 5). Paris, Cabinet des Médailles, Collection de Luynes.

Eighty years ago the Altis (sacred precinct) at Olympia was first excavated systematically by German archaeologists. Here were found a large number of bronze statuettes, plinths for statues and many other objects associated with the cult of Zeus, the principal deity worshiped at Olympia. Among the statuettes were four in identical posture, each representing Zeus in the fulness of his vigor, striding purposefully forward with a thunderbolt in his raised right hand and an eagle poised on his outstretched left arm. Later on, still other similar statuettes were unearthed, so that the tally for Olympia alone is more than a dozen, while almost identical figures have been found elsewhere on the mainland in Greece, especially in the Peloponnesus. We illustrate only a few of them (Figure 2). It is evident that this whole class of votive statuettes has its roots in the Archaic art of the sixth century B.C. There are, for example, bronze relief plaques, most of them from Olympia, which portray a similar divine figure striding out to battle with the monster Typhon. The pose is identical with that of the later bronze statuettes. These reliefs can be dated to the first decades of the sixth century B.C., and it would seem that toward the end of the century this concept of the striding deity was, so to say, "canonized" in the Zeus with thunderbolt and eagle. This sculptural convention reached the peak of artistic refinement during the first half of the fifth century.

An even more striking illustration of the importance of this type of the striding Zeus is provided by another class of minor antiquities, the early series of the official coins of Elis, the territory wherein was situated the sanctuary of Olympia. Coinage began relatively late at Elis. Whereas in the Greek world, generally, mints had been active since the early sixth century B.C., the rural communities of the northwestern Peloponnesus were content to make use of coins struck outside the area, evincing a definite preference for the celebrated coinage of Aegina, which had a turtle as its device. Coin hoards from many Peloponnesian sites have confirmed the tradition that these "turtles" were particularly "the coin of the Peloponnesus." Not until the end of the sixth century did the Eleans issue coins of their own, and it is interesting that the new silver pieces were struck to the same standard as the Aeginetan "turtles," which they rapidly

7. Bronze statue of Poseidon which was found in the sea off Cape Artemisium. Athens, National Museum.

8. *Above:* Stater of Messene, ca. 369 B.C., showing Zeus Ithomatas. Berlin, ex-Collection Imhoof-Blumer. *Below:* tetradrachm of Messene dating after 220 B.C., showing Zeus Ithomatas. London, British Museum.

Olympian Zeus continued

began to displace. The types of the new coins were intimately connected with the Olympian Zeus. On the obverse is a majestic eagle, traditional symbol of this god's power, while the reverse shows the thunderbolt, the symbolism of which is rooted deep in the ancient East.

Until now, however, it was not known that among the first coins of Elis was a type with an anthropomorphic representation of Zeus. Thanks to the generosity of Dr. Bengt Thordeman, Director of the Swedish Antiquities Service, the Royal Coin Cabinet at Stockholm has been fortunate enough to acquire an unpublished and quite exceptional *stater* of Elis (Figure 3). The reverse type is a striding figure of Zeus similar to the votive statuettes already mentioned; this is surrounded by the legend "Olympikon" written retrograde in the Archaic manner. The figure, as well as the inscription, recurs in two later issues (Figure 4). Even these later coins are of the greatest rarity. The late Charles Seltman was right in dating them about 470 and to the mid-fifth century B.C., respectively (*The Temple Coins of Olympia* [Cambridge 1921] 13, no. 37; 21, nos. 72-73). The new Stockholm coin, on the other hand, must be early because the obverse die, with its powerful representation of an eagle, is also found in combination with one of the earliest of the Elean reverse dies to portray a "human" figure—a Nike of traditional type—and this all-important die identity is obvious when we compare the obverse of the new Stockholm coin with that of a splendid stater from a Swiss private collection (Figure 5) and a similar one in Paris (Figure 6). According to Seltman's classification, these two coins—and consequently the new Stockholm coin as well—belong about halfway through the first phase of Elean coinage, which he has shown to extend from about 510 until 471 B.C., and we shall probably not be far wrong if we place the Nike reverses at about 490. It follows that the striding Zeus of the Stockholm stater must be of approximately the same date.

Important as this discovery is for the numismatist—that the striding Zeus and the "Olympikon" legend originated not in the second but in the first phase of Elean coinage—the new coin has even greater importance for the student of Greek art. Here is dramatic new evidence for the early preeminence of the theme of the striding Zeus with thunderbolt and eagle. A close study of the three successive coin issues (Figures 3, 4) reveals the broad development of Greek art during the years which the coins span. Dr. Emil Kunze has already shown how the votive statuettes follow the main development

step by step. The three coin issues (each struck, it would appear, on the occasion of an Olympiad) mirror no less strikingly three stages in the transition from the late Archaic style to the "strong" style of early Classical times, which reaches its height in the sculptures of the Temple of Zeus. It cannot be overstressed that the three coin issues show a genuine stylistic development of the traditional theme, and we can no longer accept Seltman's dismissal of the third phase as a mere "restitution," though in fairness it must be noted that the Stockholm coin had not then been discovered, and the third phase was known to him only from two poorly preserved coins of the so-called "Berlin" type. Inasmuch as the soil of Greece has only recently yielded up the new coin, is it too much to hope that one day there may be found a coin of the third phase in better condition? When this happens, it will be universally recognized that "the striding god" motif—also employed in the case of Poseidon and other deities—found its most perfect expression in the period represented by this third phase of the Elean Zeus. On the basis of new material not available to Seltman it has proved possible to date this third issue with considerable precision: it was struck ca. 460 B.C., that is, two or three years before the completion of the temple at Olympia.

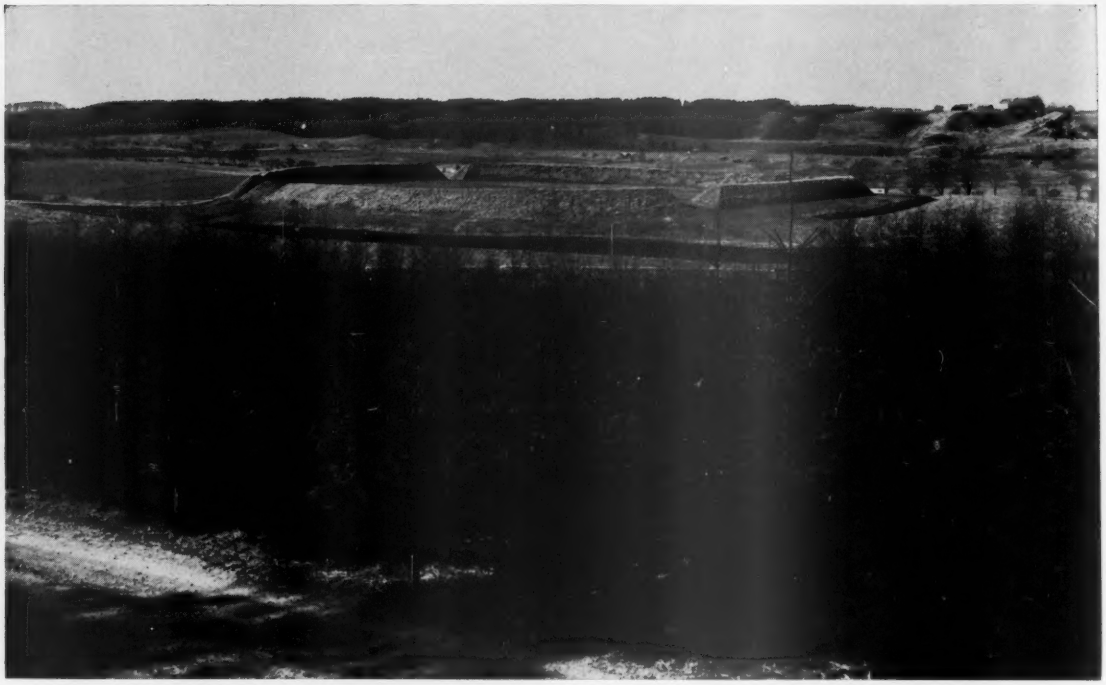
EVERYONE WHO SCRUTINIZES these statuettes and coins which show the striding Zeus—a coin type, incidentally, which was later to be copied at many late Classical, Hellenistic and even Roman mints—must inevitably recall the only monumental statue of a striding god that has survived: the Poseidon which was recovered off Cape Artemisium by fishermen some thirty years ago (Figure 7). This famous "god from the sea," now one of the glories of the National Museum at Athens, dates exactly from the period of the latest of the statuettes and of the third of the Elean official coin types. Even though it is still not certain whether the Artemisium Poseidon is a votive statue or an actual cult image from some unknown sanctuary, there can be no doubt that it represents yet another example of the persistence of the old manner of representing the gods right down to the Classical period proper when, largely as a result of new ideas propagated by new schools of drama and poetry, the whole concept of the various deities was fundamentally changed, with far-reaching consequences for the artists charged with their interpretation. This philosophical and artistic revolution, however, was still in the future when Libon built the great Temple of Zeus.

It is our contention that the sanctuary was designed originally to house a monumental cult image in the same tradition, at once venerable and ancient, intensely conservative but artistically as modern as the later bronze statuettes and the Zeus on Elis coins of the third phase.

It must be admitted at once that there is nowhere any specific allusion to the existence of such an image in the cella of the Olympian temple during the quarter-century and more which was to elapse before the erection of Phidias' enthroned Zeus as "ruler of the world," a milder and less disturbing concept which is prefigured in at least one passage in Homer (*Iliad* I.528). It is possible, indeed, that a striding Zeus of this kind was never executed, either because of the lack of funds or an actual mishap in casting, or because no one could be found to undertake the casting of a statue on the scale demanded by the setting of the temple interior. The Poseidon from Cape Artemisium is nearly seven feet in height, but if it were not to be dwarfed by its surroundings, a cult image in the Olympian temple would have needed to be at least twice that size, while the proportions of the Phidian replacement argue for one appreciably larger still. The casting of such a statue would have presented serious problems, but that it was contemplated, and perhaps even achieved, seems rather likely. A statue of the striding type would have been more appropriate to the "strong" Doric architecture of the temple's interior and to the rest of its sculptural embellishment. In fact, a statue of this description by the sculptor Hageladas of Argos is known to have been erected about 455 B.C. on Mount Ithome, in Messenia. Some idea of the appearance of this lost cult image may be gained from certain fourth- and third-century coins from Messene (Figure 8). Moreover, a striding Zeus of this description would have filled the gap that undeniably existed between the completion of the temple ca. 457-456 B.C. and the invitation to Phidias after his completion of the Athena Parthenos in 438. What is more, the statue postulated is one that would be entirely consistent with the beliefs and tastes of the generation immediately following the Persian Wars, the generation which had conceived and built one of the most magnificent temple buildings of its time. The case for a planned striding Zeus at Olympia preceding the enthroned cult image must now be considered formidable—though it is hard to see, perhaps, how there can ever be actual proof of its existence, which would have been of comparatively short duration.

THE AUTHOR, a graduate of the University of Munich (1924), studied at the German Archaeological Institutes in Rome and Athens. He spent six years in Italy and Greece (1932-1938), specializing in ancient numismatics, a field in which he has published monographs as well as many articles and catalogues. Dr. Schwabacher is now Curator of Ancient Coins at the Royal Coin Cabinet in the Museum of National Antiquities in Stockholm, and Lecturer at the University of Stockholm.

A more extensive and fully documented version of this article is to appear in the periodical *Antike Kunst* (Basel).



The Fyrkat camp from the southeast, as it appeared during the 1959 campaign.

FYRKAT

A VIKING CAMP IN DENMARK

By Olaf Olsen

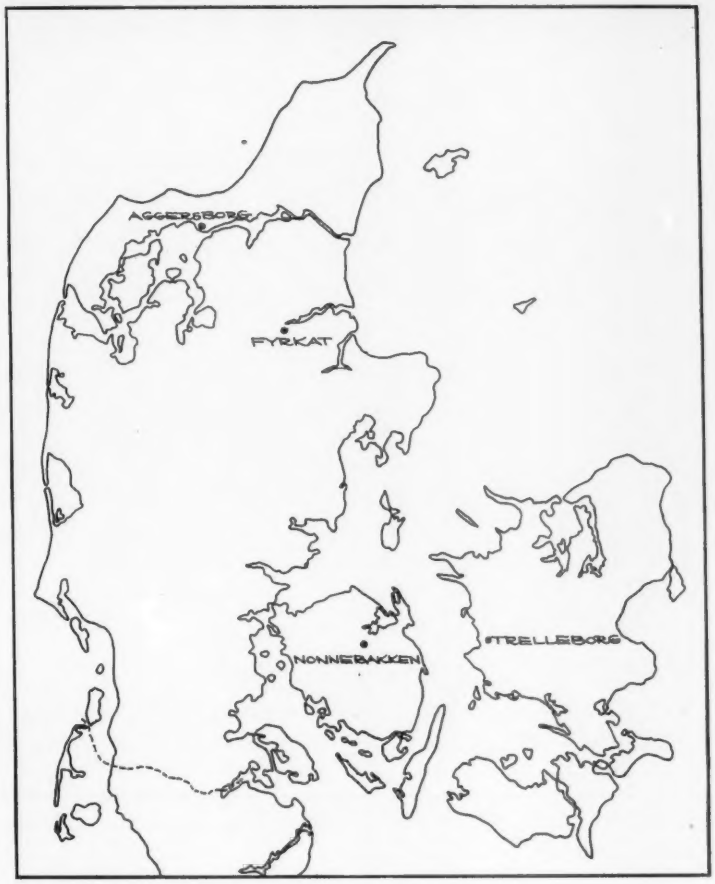
THE VIKING CAMP OF FYRKAT, in the north of Denmark, is situated on a small ness, or promontory, which juts out into a broad glacial valley two miles west of the old town of Hobro. On three sides the ness is surrounded by flat meadows which in earlier times were swamps. The only proper road to the camp led from the hills in the southwest, but there was probably also access from the sea. It is evident from the steep northern slope of the ness that the small Onsild River, which now flows by the camp at a distance, once passed directly below the hill and cut its way into it.

The position of the camp was a fine protection in itself. The narrow link to dry land was easy to defend; the shallow river could be used by traffic to and from the camp but was unsuitable for an attacking fleet, and the wide prospect secured it from sudden attack.

The true meaning of the name "Fyrkat" is not known, and it is possible that the camp was first so named long after its demolition. No historical records of the camp exist. It is not mentioned in any of the few written records of the Danish Viking period and no historic event can be linked to it. Knowledge of Fyrkat is therefore based on the evidence of excavation alone.

The chief material used in constructing the camp buildings was wood, and the same perishable material was used as paving and for reinforcing the rampart. With the exception of a few remains of posts in the gates and under the rampart, all of the timber has now disappeared; most of it was burned, some was removed, and the rest rotted away. In spite of this, it has been possible to trace the plan and buildings of the site; this is due to the fact that the construction was based mainly on a system of posts sunk into the earth. The post-holes which remain reveal the plan of the roads and houses.

FYRKAT IS A VIKING CAMP of a special type which is as



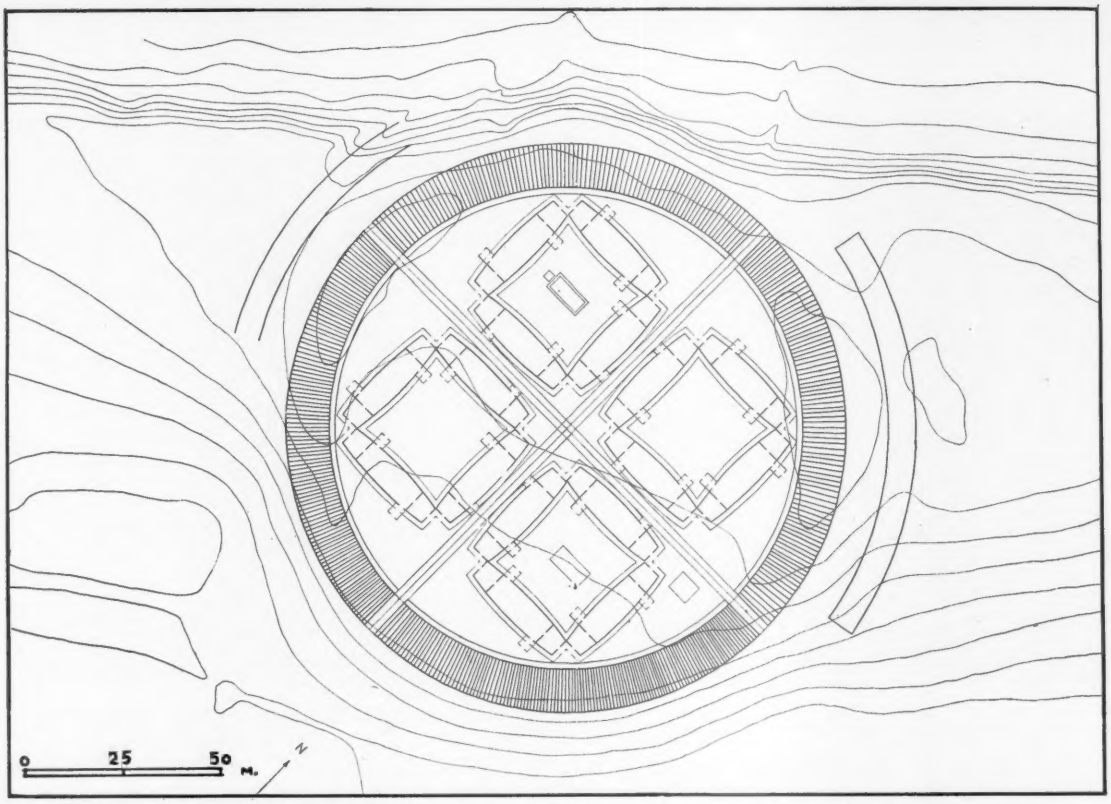
MAP OF DENMARK, SHOWING THE LOCATION OF THE FOUR SIMILAR VIKING CAMPS.

yet known only in Denmark. This type was first found by Poul Nørlund in the 1930's at Trelleborg, in Zealand. Since then, three others have been found: Aggersborg, in North Jutland, Nonnebakken, in Odense, and Fyrkat. These were all excavated by C. G. Schultz, who died in 1958 just as the Fyrkat excavation was approaching completion.

The four camps are built according to a scheme which is followed with the utmost precision. Each consists of a circular area surrounded by a rampart and a ditch. A gate pierces the rampart at each of the four points of the compass. A road runs straight as an arrow from the north gate to the south gate, another from the east gate to the west gate. Crossing at the center of the camp, they divide the site into four equal parts. In each of the quarters is a block of buildings consisting of four large identical wooden houses enclosing a square courtyard. The houses all have the same ground plan, with curved longitudinal walls and straight gable ends, and their interior divisions are all identical. The Roman foot is the unit of measurement. The four camps, however, are not entirely alike. They differ from one another in size, and each has its own individual features and peculiarities.

The weakest part of the defences at Fyrkat is the ditch. It follows the circular rampart at a distance of about 10.50 meters but is found only on the high-lying land outside the northeastern and western parts of the rampart. The ditch is V-shaped, with gently sloping sides, and dry at the bottom. It is barely as deep as the height of a man, and only 7-8 meters wide. It was never strengthened with posts or palisades, and its defence value must have been almost negligible. The builders attached so little importance to the ditch that they never bothered to finish it.

On the other hand, no effort was spared in the construction of the circular rampart. Its present appearance as a grass-covered earthwork with sloping sides and



Restored plan of the Viking camp at Fyrkat, showing the rampart, the roads bisecting the circular enclosure and the groups of buildings occupying each section of the camp.

FYRKAT continued

narrow top is the result of the efforts of the National Museum and is only intended as an indication of the position and height of the original rampart, which looked entirely different and must have resembled a vast, earth-filled wooden crate. The rampart had a vertical inside face and a steeply sloping outer one, covered with horizontal planks in a solid framework. Palisades also protected the slope of the outer face. Transverse anchored beams prevented the façades from caving in. A wooden breastwork must have crowned the outer face, which was further strengthened with struts and anchored to thick vertical posts in the middle of the rampart. The earthen fill of the rampart consisted for the most part of turf. The inner diameter of the rampart was 120 meters; it was twelve meters thick and probably about three meters in height, not including the breastwork.

Originally the four gateways were roofed over and appeared as narrow tunnels through the rampart. This roofing connected the four sections of the rampart, which could therefore be defended as one.

The sixteen large houses of the site are each 28.50 meters long, equivalent to ninety-six Roman feet. They are 7.50 meters wide across the middle and about five meters at the gable ends. These are not stave-built as at Trelleborg, but constructed in a mixture of the bole-house and the wattle-and-daub techniques, that is, the gable ends were usually made of horizontal planks, the curved longitudinal walls of clay-daubed wattle, kept in position between rows of double posts. However, the main weight of the large roof was not carried by the walls, but by two transverse rows of four posts inside the house. These posts, which were dug into the earth as deep as a meter, also served as part of the two transverse partitions in the house. The material used for roofing was shingles, thatch or perhaps overlapping boards.

Each house is divided into three rooms; a small room at each end and a large hall—over eighteen meters long—between them. It is not certain for what purpose the

The Fyrkat camp during excavation. The outlines of one of the camp buildings and the partitions between its rooms are clearly indicated by the post-holes.

end rooms were used, but the hall was undoubtedly both living and sleeping quarters. A number of houses showed traces of a large hearth in the middle of the hall, and along the walls there were probably broad sleeping benches. At least fifty men could sleep in each hall without the room becoming too crowded.

It is by no means certain that all the buildings were used as dwellings. In one house of the southeastern block there appears to have been a smith's workshop, while another in the same block had no hearth in the hall but contained considerable remains of grain and possibly served for storage. The lack of a hearth, however, is no definite indication against habitation, for over most of the camp site there is only a thin layer of top soil, and in some cases the hearths could have been plowed away without leaving a trace.

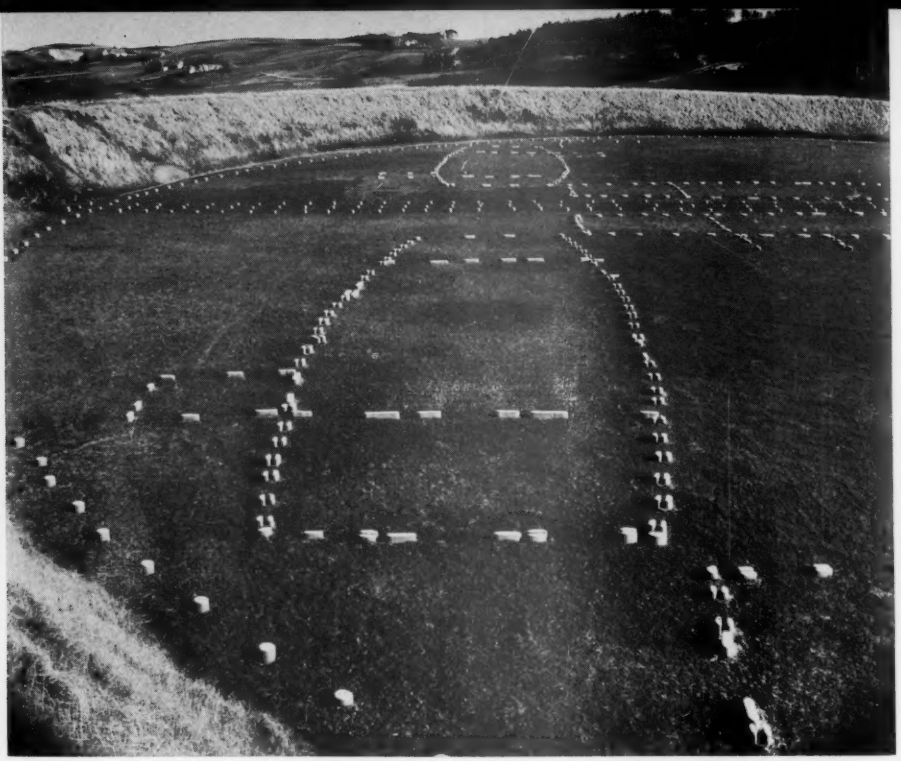
The houses have four outer doors, one at each end and one in each longitudinal wall. The doorways are easily recognizable by the oblong post-holes of the door-jambs. Both side doors lead into the hall near the inner partitions, and they are always situated diagonally to each other. In the houses which lie along the axial roads, the door facing the street is never placed opposite that of the corresponding house on the other side of the road. This avoided collision between the inhabitants of the two houses in case of an emergency turn-out.

The side doors of the Fyrkat houses all have porches in front of them. The porches facing out toward the road are small and open, while those into the courtyard or facing the rampart are of considerable size and resemble church porches. They are not always built with the same precision as the houses themselves, and this may indicate that they do not really belong to the original system. Similar porches have not been observed in the other Viking camps.

In the enclosed courtyards in the northwestern and southeastern blocks there are small rectangular houses with hearths. Near the eastern gateway there is also a little house, presumably for a guard, and a similar one lies outside the western gate. There are also, presumably, small houses in the other two courtyards, which are not yet excavated.

Both of the straight roads between the gates and the circular road which runs just inside the rampart were paved with wooden planks which rested on longitudinal joists, kept in position by wooden pegs. The axial roads were laid on three rows of such joists, while the circular road was supported on two rows.

THE VIKINGS had their cemetery on the protected part of the promontory, northeast of the camp. Thus far, twenty-three burials have been excavated, all of them inhumations. Pagan burials rich in grave goods—marked on the surface by a small hearth, where the ritual fire was made —are found here, side by side with Christian burials now containing nothing at all, not even skeletons, as these



Above and opposite page: Two views of the interior of the Fyrkat camp, seen from the northwest. The post-holes are filled with concrete markers which clearly show the plan of the houses and of the two main streets crossing in the center. At the rear is the south gate of the camp. The rampart enclosing the camp has been restored as an earth embankment.

FYRKAT continued

have totally disintegrated in the lime-deficient soil. In two of the richest pagan graves the bodies were laid in wagon frames; only the nails of these are preserved. A broad road laid with planks runs across the cemetery, and over a distance of about fourteen meters it widens to form a small platform five meters in breadth. Here the funeral rites probably took place.

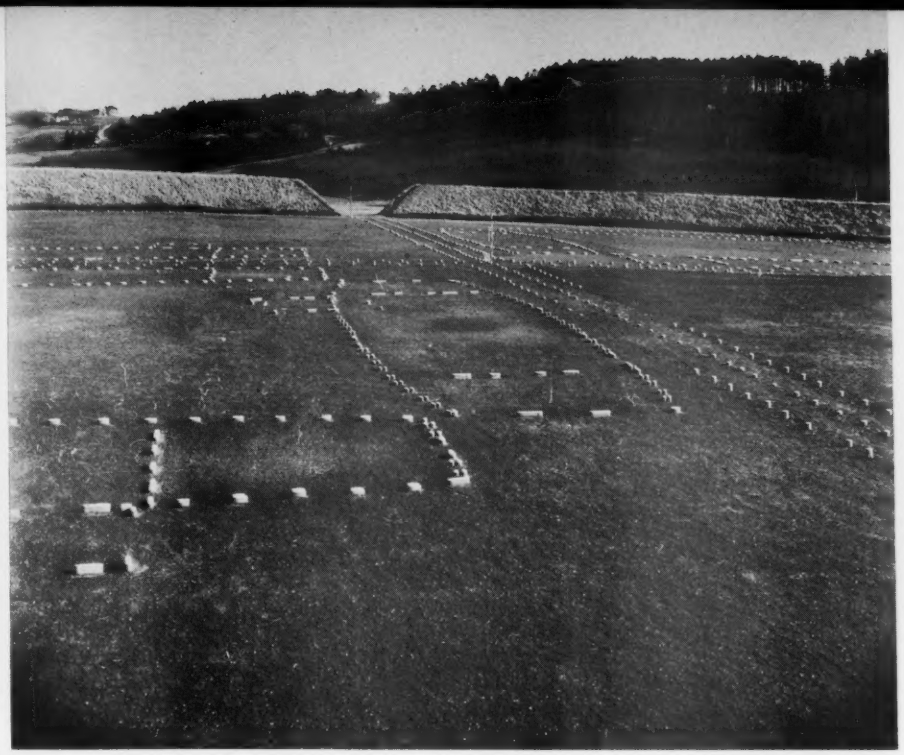
In comparison with the rich ornaments, utensils and weapons of the pagan graves, the rest of the small finds from the site seem rather insignificant. However, the finest ornament found was not from a grave but from the rampart. This is a fragment of a little gold pendant showing a stylized bird executed in delicate filigree.

Finds typical of settlement sites—potsherds, bones, tools, etc., which usually occur in large quantities during excavation of dwellings—have been recovered only to a modest extent at Fyrkat, and the usual layer of refuse and litter is completely absent. From this it can be assumed that the camp was not in constant use over a long period, and that it was never a town in the true sense of the word. Fyrkat is definitely a military site, a barracks with order and discipline, precision and regimentation.

With the aid of the objects found it is possible to date Fyrkat to the last decades of the tenth century or the beginning of the eleventh. This dating, which future excavations in the burial ground may define more accurately, agrees closely with the dates of Trelleborg and the camp at Nonnebakken. The fourth camp of this type, Aggersborg, is situated on the site of a demolished Viking village, and because of this it proved impossible to date it from the finds. However, in most details there is a very close relationship between this camp and Fyrkat. Even such a concealed feature as the timber construction in the rampart is practically identical in the two camps, and there is no doubt that they were erected at about the same time, possibly by the same builders.

Thus the four known camps of the Trelleborg type all belong to one period. Only one person, the king, could initiate such a colossal task. The camps are therefore the work of Harald Bluetooth or of his son, Svend Forkbeard, who dethroned his aging father about 985.

AT THE CONCLUSION of the excavation at Trelleborg, Poul Nørlund suggested that this camp was a winter barracks or training camp for Svend Forkbeard's Viking army. For twenty years, beginning about 990, this mili-



Fragment of a gold pendant in filigree work, which was found on the rampart of the camp.

tant king organized incessant raids against a weak and disrupted England. The Vikings were tempted by the vast taxes they could extort, the so-called *danegæld,* which the English willingly supplied the Viking fleets in order to avoid plunder and violence.

The discovery of three more camps of the Trelleborg type—and more may yet be found—has strengthened Dr. Nørlund's hypothesis. The large bands of Vikings whom the easily earned *danegæld* turned into professional warriors, with no desire to return home to the toilsome work in their villages, could hardly be accommodated in one camp. On the other hand, it should not be forgotten that the four Viking camps were more than just barracks. They were also strong fortresses, all situated in strategic positions throughout the country, near important traffic routes. Fyrkat, for instance, lies near the place where the main road of East Jutland crossed the Onsild River, which was itself an important means of communication. Therefore it is not unreasonable to assume that the Viking camps also served for policing the country. Without full control of his unruly homeland, King Svend could scarcely have carried out the large-scale campaigns which finally gave him the crown of England in 1013.

The clearly defined plan of the camps, the well considered details and the precision of their construction must have been the fruition of centuries of experience in the art of fortification. However, little is known of Denmark in the Viking period which might suggest the origin of these camps. They appear suddenly. Therefore their prototype has been sought abroad, in the geometric

The remains of posts which supported the roof of the tunnel gateway at the southern gate of the camp.

FYRKAT continued

Roman camps, the remains of which the Vikings could have studied in England, and in the large fortified towns of the Near East. This question is extremely complicated and probably cannot be solved until future excavations in Denmark and elsewhere have added considerably to our knowledge of the military construction of the period.

While the plan of the camp may seem foreign, the houses are based entirely on Danish building traditions. In the Viking Age settlements below Aggersborg and at Lindholm Høje, near Aalborg, have been found several houses with curved side walls and free-standing, roof-bearing posts. It is this house type which is encountered in the Viking camps. Here the houses were built with a precision never attempted in the villages, and in certain respects they were redesigned and developed. But in fundamental principles of construction no decisive changes were made.

Fyrkat was not long in existence. It was destroyed by fire, perhaps even during the lifetime of Svend Forkbeard. We do not know whether the disaster occurred during battle or whether it was caused by accident. The danger of fire was ever present, owing to the compactness of the buildings within the rampart.

Fyrkat was never rebuilt. When England was conquered and the Viking raids gradually ceased, the large Viking armies were disbanded. The Danish king was unable to support a large permanent army in his homeland; in peacetime he had only his house-carls—a modest number of elite soldiers who guarded his estates and escorted him during his travels.

A camp the size of Fyrkat was far too large for the house-carls alone; even at full strength they could scarcely have defended the rampart effectively. Under these circumstances the Viking camps were no longer of any use, and they vanished as abruptly as they had arisen a few decades earlier.

The defences of the ensuing period followed a completely different pattern, that of the Anglo-Norman *motte*. This consisted of a high bank, surrounded by a ditch and an outer rampart with steep sides and a small plateau at the top, on which was a tower. This structure served as a refuge in emergencies, while the actual dwelling site was on a lower, weakly defended bank. In contrast to the large Viking barracks which accommodated hundreds of soldiers, the *motte* had room only for a few and could be defended by a handful of men.

This complete change reflects the historical development which made the magnificently built and splendidly fortified Viking fortresses obsolete before they were old.

ONE OF FOUR SIMILAR VIKING CAMPS known in Denmark, Fyrkat and one other have been restored by the National Museum and opened to the public. Olaf Olsen, who is Assistant Keeper in the Mediaeval Department of the National Museum, assisted at and, later, directed the Fyrkat excavations. From a booklet which he prepared for the guidance of visitors the foregoing account has been adapted.

By A. H. Gayton

Early Paracas Style Textiles From Yauca, Peru

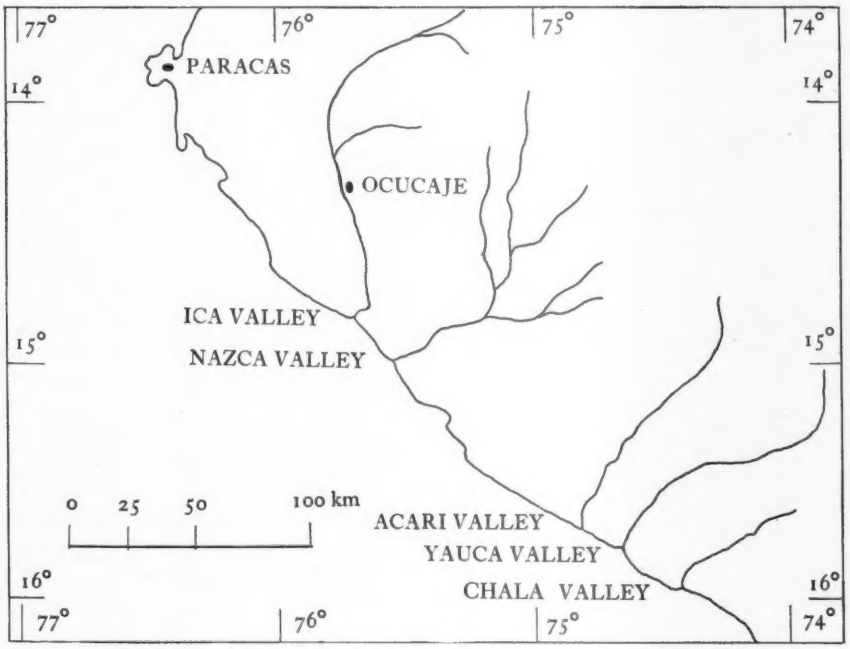
DISCOVERIES in unexplored storage collections can be as intriguing as those made in field excavations. The Max Uhle Collection of Peruvian antiquities at the University of California, Berkeley, includes some fifteen hundred textile items, many of which were analyzed technically and published by the late Lila M. O'Neale. Her selection of specimens seems to have been based, in part, upon their positive association with pottery specimens which were already placed in the ceramic chronological sequences for ancient Peru. None of them were from sites south of Nazca. Many of the textiles remained untouched in an old system of storage which discouraged casual investigation. The recent transfer of the University of California Museum of Anthropology's holdings to new quarters, the Robert H. Lowie Museum of Anthropology, gave the opportunity, long delayed, to examine each textile specimen as it was placed in new, accessible storage facilities. Of the many fabrics quite literally brought to light, none is more important than a small group from Yauca, far south of Paracas and Nazca, roughly midway between the Chala and Acarí valleys.

Excavations made in these southern localities by Max Uhle in 1905 are not documented by detailed information as are his earlier explorations along the Peruvian coast. His field catalogue merely lists specimens by site. Actually, he and his wife were returning from an inland tour but in characteristic fashion, while moving northward from Chala to Lima, he investigated the areas new to him. The pottery he secured from the Chala, Yauca and Acarí valleys is negligible in quantity and not significant in style: Uhle's few vessels from Yauca have been designated as of a late style (Ica-Chincha) by A. L. Kroeber (*Peruvian Archaeology in 1942,* Viking Fund Publication 4 [1944] 23). The skeletal material recovered has not been analyzed. But the textile finds were considerable, and of the many fabrics from Yauca there are five which need no ceramic determinants for their chronological placement: their decoration speaks for itself. It is obvious that they belong to the Chavín-influenced Paracas style period.

THE FIVE FABRICS have in common an organization of narrow decorated webs flanked by plain blue and red pin-striped cloth sewn to one or both sides. They represent a locally standardized form of fabric composition, although the embellished central strips differ from one another in design. In each specimen the full width of the decorated web is preserved; other original dimensions are incomplete. There is no clue to the purpose which they once may have served.

Two of these textiles determine the age of the group: they are ornamented with feline deity figures in Chavinoid style, a recognized ingredient of the early phases of Paracas artistic expression in south coast Peruvian culture (Figures 1, 2). The Chavín elements in Paracas art have been discussed by A. L. Kroeber, by Gordon R. Willey and especially by Julio C. Tello, the discoverer of both Chavín and Paracas cultures. That a Paracas style of Chavinoid character extended as far south as the Yauca valley was not suspected, however, and it is as yet unreported south of Nazca. Hence these textiles constitute a handsome and novel testimony of the far-reaching influence of both Paracas and Chavín artistic concepts.

The most significant example, of brick-red and dark blue wool double-cloth weave, consists of two pieces (Figure 1). They are not parts of the same web, but there is no reason to doubt that they are portions of a single specimen. One is a strip with deity figures which has remains of sewing thread along one side. The other is a similar strip ornamented with a three-strand angular guilloche and elements of the deity motif; it is loom-joined to plain white cotton cloth and has bits of blue and red-striped fabric sewn on each side. In a two-strand or three-strand form the guilloche is a tracer trait in the early pan-coastal Chavín style, which dates back to at least 500 B.C. on the north coast. Within this style the guilloche has been rendered in several media, such as bone, stone, pottery and metal. S. K. Lothrop has noted



MAJOR VALLEYS ON THE SOUTH COAST OF PERU.

Paracas Textiles continued

the guilloche as an element of Chavín style, particularly as it occurs in goldwork in association with the Chavín feline deity (*American Antiquity* 16 [1951] 227, figure 71). On the south coast the guilloche appears on early Paracas pottery and gourds (J. C. Tello, *Paracas:* I [1959] plates IIa, IIIb, Va, figures 31-36). In a textile medium a two-strand guilloche, accompanied by square crosses, is produced by a netting (non-woven) technique in a wool shirt tentatively attributed to a Nazcan provenience (J. B. Bird, *Paracas Fabrics and Nazca Needlework* [1954] plate 134). Guilloches seldom occur in the wealth of geometric ornament on pottery or other forms of decorative art in later Peruvian periods. In fact, they are far more familiar in Middle American art than in that of the Andean region.

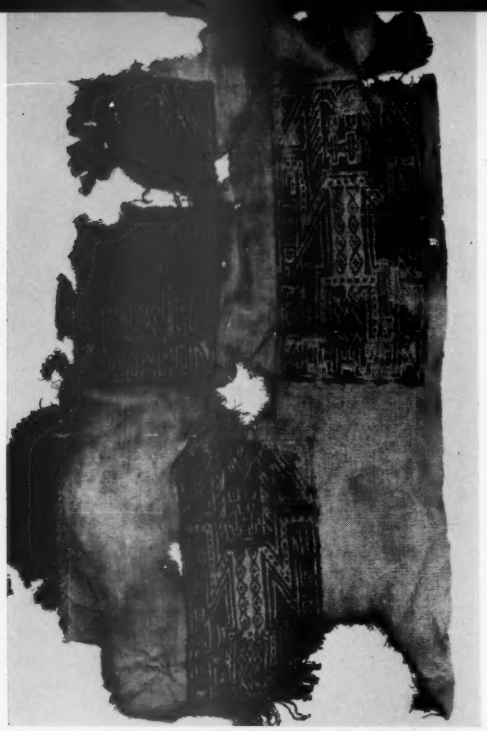
Now for the first time the angular three-strand guilloche appears in Peruvian cloth, accompanied by panel figures of indubitable Chavinoid derivation having a close resemblance to those (also with guilloches) on gourds from Ocucaje, Ica Valley, in the Truel Collection. Made of wool yarns, the weave is double-cloth of fine workmanship, and the strong, deep blue background with brick red forming the designs creates a strikingly handsome effect. The intricacy of the feline deity is obvious (Figure 1, left). But the rendering of the seemingly simple interlaced motif in cloth is significant. The guilloche can be three-dimensional, that is, as two or more twisted or plaited elements of cord, clay or metal. In pictorial representations there must be the illusion of three-dimensional plasticity, and on bone, stone, metal, pottery or gourds this is achieved by controlled, repetitive strokes

1. *Left:* Dark blue and brick-red wool double-cloth with Chavinoid feline deity figures. Curvature of the H-shaped fangs is suggested by the inner hooked lines. A side column shows variations of the feline mouth motif. *Right:* Fragment with angular three-strand guilloche to which bits of red-striped blue cloth are sewn. Imperfections are due to decaying blue yarns. UCMA 4-8082. Weft width of deity strip ca. 17.5 cm., of guilloche fragment ca. 20.5 cm.

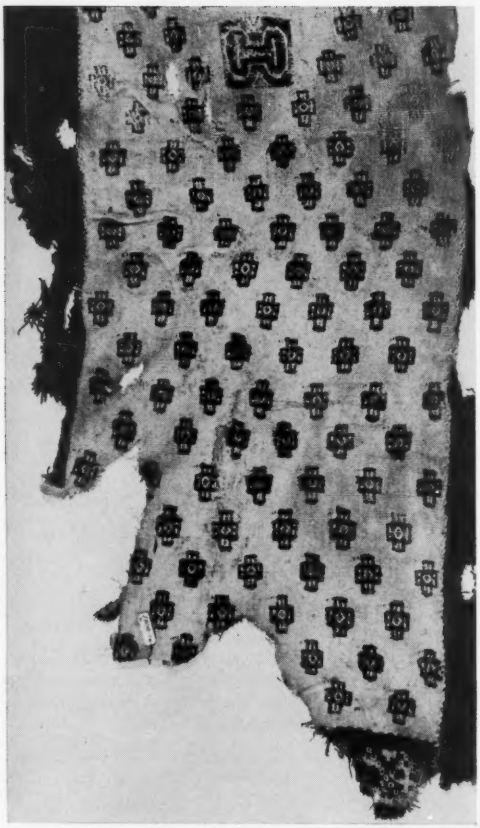
of a brush or graver. While fine craftsmanship is essential to an exact rendering, the design created by the strokes is "natural" or physically compatible with tools for linear graphics. However, the raised angular three-strand guilloche made by champlevé on the gold gorget shown by Lothrop is a forced adaptation of a technique to a motif. So, too, is the similar guilloche in our Yauca cloth. As with all woven ornament, the motif must be built weft by weft upon the warps, and the double-cloth construction used here demanded exceptional skill to produce the perfect representation in this fabric. The illusion of overlapping elements has been carefully indicated; without it the design would have been merely a flat diamond grid. Thus, while the symbolic deity figure is in itself evidence of the weaver's virtuosity, the deceptively simple geometric motif is no fortuitous accompaniment or mere space-filler. Both guilloche and deity are textile interpretations of significant designs already known to the weaver in fixed association from another medium such as pottery or gourds.

THE SECOND TEXTILE (Figure 2) has no guilloche motif, but repeated panels of a slightly different version of the Chavinoid feline deity. Here the design is formed in the negative or white areas of the natural cotton cloth left bare among the inserted dark blue wool yarns. The technique is probably brocade. At the top and bottom edges of the oblong panels there are lines of henna yarn forming horizontal ridges which superficially resemble stem-stitch embroidery, but which probably were bobbin-made on the loom while the weaving was in progress.

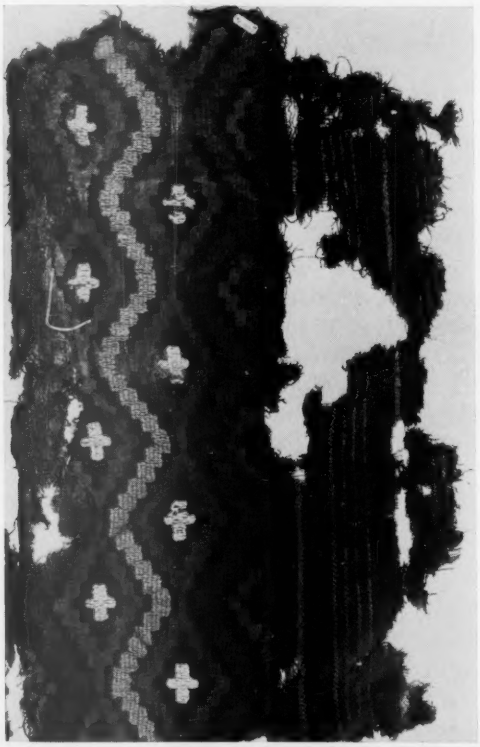
The presumption of a brocade technique for this fabric



2. White cotton cloth brocaded in blue wool with feline deity figures. Lines of henna cross upper and lower edges of each oblong. A fragment of red-striped blue cloth remains sewn to this strip. UCMA 4-8083. Weft width of decorated strip ca. 25.5 cm.



3. Square cross motifs brocaded in blue and henna wool on white cotton. The H-shaped deity mouth appears as a central medallion (top of photo). Remains of red-striped blue cloth sewn on each side. UCMA 4-8087a. Weft width of decorated strip ca. 20.5 cm.



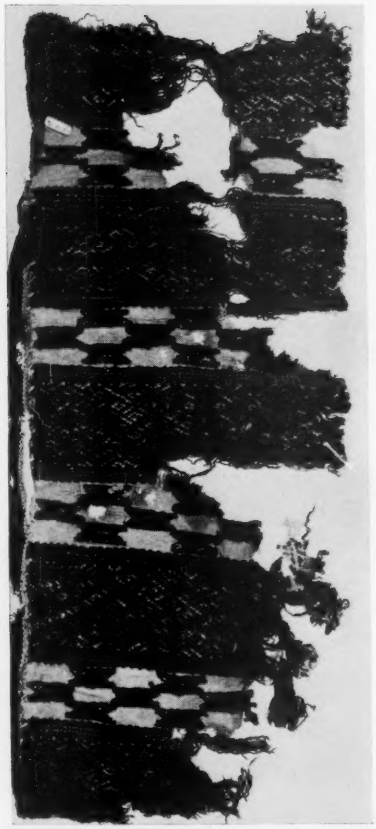
4. *Right:* Dark blue and brick red wool double-cloth with articulated diamonds and central crosses; extra green and yellow yarns emphasize crosses and zigzag boundaries. Red-striped blue cloth sewn on each side. UCMA 4-8086a. Weft width of decorated strip 15.5 cm.

is supported by that of the third textile, which is ornamented with square cross motifs of alternating blue and henna wool in quincunx arrangement on a white cotton background (Figure 3). On the reverse side the brocading wefts pass under a few warps, then float diagonally to their next repeat in the row above. A token rendering of the deity's H-shaped, fanged mouth appears as a single central medallion. The square cross form also occurs as a gold gorget (Lothrop, figure 72a), as decoration on a Chavín-style carved stone feline (J. A. Mason, *The Ancient Civilizations of Peru* [1957] plate 37A), and with the two-strand guilloche on the netted shirt which has been mentioned above.

The purely geometric decoration in the fourth textile (Figure 4) is created in dark blue and brick-red wool double-cloth, with what are probably brocading wefts of green, light yellow and dark yellow emphasizing the crosses and zigzag boundaries of the articulated diamond motifs. The extra yarns, which add color and boldness, also make a marked textural effect. While this fabric has no typical Chavín or Paracas designs, except possibly the crosses, the repeated diamonds are present in miniature on both versions of the deity figure in the two Yauca specimens already described.

The fifth textile (Figure 5) is entirely blue and white, the thick wool brocading wefts forming richly textured bands of geometric motifs across the natural white cotton web. It belongs with the others by virtue of its composition—a decorated strip flanked by blue and red-striped cloth—and by similarities of yarn, base cloth and color qualities.

These specimens and others from Yauca await full technical analysis. They were recently viewed by Junius B. Bird, who concurs with the tentative assumption that brocade is used for the workmanship so designated. Dr. John H. Rowe and Mr. Lawrence Dawson, who have also examined the specimens, place them in the Paracas T-2 phase of their chronological sequence for the south coast of Peru (*Revista del Museo Regional de Ica* IX: 10 [1958] 12). This phase is the one immediately preceding that characterized by the classic Paracas Cavernas (T-3) ceramic style. By their provenience these fabrics extend the southern boundary of early Paracas influence, and by their artistry they demonstrate the weaver's ability to convert cultural symbols into decorative themes.



5. Strip of white cotton cloth brocaded with dark blue wool in geometric designs. Fragments of red-striped blue cloth remain on one side. UCMA 4-8087c. Weft width of decorated strip ca. 21.5 cm.

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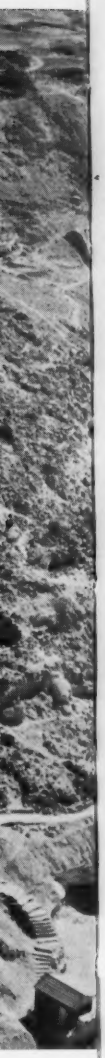
Bird's-eye view of the acropolis, looking southeast. To the west is the Nabataean retaining wall (partly reconstructed). In the northwest corner is the Northern Church, and farther south, a portico. To the east is the citadel with its partly reconstructed south wall. Beyond it are the ruins of the Roman town. Along the western slopes the ruins of the Byzantine town are clearly visible. An excellent specimen of a Byzantine house and cave complex is to be seen at the lower right-hand corner.

AVDAT

A CARAVAN HALT IN THE NEGEV

BY ABRAHAM NEGEV



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THE FEW ANCIENT CITIES scattered in the deserts of Syria and Palestine have always attracted the interest of travelers and archaeologists. The drama of the tremendous struggle against the encroaching desert has had a strong appeal for every visitor to those waste lands.

E. H. Palmer, the eminent English traveler, was the first to put Avdat* on the map again. He rediscovered the city in 1870, while traveling across the desert of the Exodus, where he endeavored to retrace "the footsteps of the flocks of Moses." The site was later visited by the Czech traveler Musil, by the French explorers Jaussen and Savignac, by the English archaeologists C. Leonard Woolley and T. E. Lawrence, and by the German Theodor Wiegand, then an architect in the service of a Turco-German unit for the preservation of antiquities, which was attached to the headquarters of the German expeditionary force in Palestine during the First World War. The first full-scale expedition to the Negev, led and financed by H. Dunscombe Colt, did some trial digging at Avdat, but its main effort was concentrated on the neighboring towns of Shivta and Nitzana.

The renaissance of historical and archaeological studies, in the wake of the reestablishment of the Jewish state, necessarily led to an increasing interest in the archaeological remains of the Negev. This quest for knowledge benefited from the reopening of the traditional trade route connecting the Gulf of Aqaba with the shores of the Mediterranean. Avdat, which lies on one of the commanding heights overlooking this artery, was given top priority for excavation and reconstruction by the Committee for the Preservation of Landscape and Antiquities, attached to the Prime Minister's office. Work on the site started in May 1958, under the direction of Professor M. Avi-Yonah, and has continued under the supervision of the author since November of that year.

Because of its location deep in the desert, Avdat had the good luck to escape the fate of many ancient cities which during the ages have been used as stone quarries. The ruins of Avdat lie practically undisturbed except for destruction caused by earthquakes, neatly preserved in the dust carried by the desert winds. This efficient dust cover, as deep as twelve to fifteen feet, in addition to the fact that the Beduins had no use for building materials, has kept the ruins almost intact, making the site an archaeologist's dream. It has, in addition, a further advantage. Except for the acropolis, which was always in use, each of the three historical towns occupied a different area. These were the Nabataean town, destroyed about A.D. 106, the Roman town, built in the third century A.D., and the Byzantine town which lasted from the fifth to the eighth or ninth century. This is why the chronology of Avdat could be established, as we shall see, with comparative ease.

AVDAT LIES NEARLY TWO THOUSAND FEET above sea level, on a mountain ridge which runs in a north-south direction, and has a spur extending to the west. The rainfall, which never exceeds four inches, provides a rather meager supply of water. The nearest permanent source of water, somewhat bitter, is located about two and a half miles away, in a canyon two hundred feet deep. The inhabitants of Avdat were thus forced to rely almost entirely on their cisterns. Yet, since drought is a frequent visitor to the Negev, on many an occasion these must have remained almost empty throughout the year. Nevertheless several cities, villages and farmsteads besides Avdat flourished for centuries in this hard, rough country.

The Negev knew three periods of settlement: the age of the Patriarchs, the time of Solomon and later Judaean kings, and, finally, a long period covering more than a millennium, from the conquest of Palestine by Alexander the Great to the eighth or ninth century of our era. The history of Avdat, as far as our present knowledge extends, belongs entirely to the last of the three periods. It appears that a dominating political power, supported by a strong military establishment, was a *sine qua non* of flourishing trade routes, and thus of civilization in the Negev.

As a result of extensive excavation the history of Avdat can now be reconstructed with some certainty. According to the evidence of a well dated pottery sequence, the first Nabataean settlement was founded on the western spur of the ridge about the beginning of the third century B.C. The conquest of southern Palestine and Egypt by Alexander seems to have encouraged the Nabataeans, originally a nomadic tribe in the Arabian desert which, in the sixth century B.C., settled on the other side of the Jordan, to penetrate into the Negev. They soon established trade routes connecting the port of Gaza both with the Red Sea and with Petra, their capital. These roads converged at Avdat, becoming a single route leading to the Mediterranean. The remains of this first phase are mostly pottery, some of which was imported from abroad, as well as some coins of the early third century B.C.

In the decades round the turn of the first century B.C.-A.D., a small Nabataean town was built on the northern part of the plateau. An acropolis on the western spur was fortified at approximately the same time. The

* The form 'Avdat, now used in Israel, is also the ancient Nabataean name of the city. The Greek form of this name is Eboda, or Oboda. The Arabic name is 'Abda. The neighboring towns of Shivta and Nitzana were called Sobata and Nessana respectively in Classical and Byzantine times, Sbeita and Auja el Hafir by the Arabs.

Nabataean inscription (ca. 9 B.C.-A.D 40) reading: Obodas and Fasail and Saudat, the sons of Haretat.

Nabataean cup, with black design painted on the pink clay. A unique specimen of this class of pottery. Diameter 2½ in.

Bronze lamp in the form of a human head (a barbarian), one of twenty-five bronze objects, most of which are imports from Rome or Roman provinces. On the nozzle is a Nabataean inscription.

Avdat continued

topography of the place required the erection of impressive retaining walls along the western, northern and southern slopes of the spur in order to provide support for the public buildings, and to extend the area of the town. The only remains belonging to the second phase are the retaining walls, repaired in later times, and a perfectly preserved winding staircase leading to a spacious portico on the acropolis. Unfortunately, very little has remained of the magnificent Nabataean temple which once occupied the northwestern corner of the acropolis. Many of its architectural elements are embedded in the walls and floors of a Byzantine church which later occupied the same place.

The earliest inscriptions discovered belong to this phase. These are engraved on small white marble tablets as well as on large building stones buried in the debris of the staircase and the area of the acropolis. The inscriptions are all dedications, some bearing the name of Aretas—referring to King Aretas IV (9 B.C.-A.D. 39).

Only trial digs have been made in the Nabataean town itself. Their main object was to provide a more precise chronology than was available for the Nabataean pottery. This was made possible by the accumulation of fine ware dumped on the site. One of the dumps, in use from the end of the third to the middle of the first century B.C., yielded some twenty thousand fragments of painted pottery. Among the finds were many figurines of humans and animals, coins and imported pottery—Parthian, Rhodian and Megarian.

One of the most important discoveries was a center of pottery making—the first so far to be discovered in the Nabataean kingdom. This establishment, consisting of two rooms and a kiln, was at the eastern end of the town. One room was for the preparation of the clay; in a corner was found a vat containing some chunks of clay. In a second room were preserved the stone base of the potter's wheel and a bench for drying the vessels before firing. The kiln is a two-story stone structure, seven feet high. Some fragments of unfired vessels were actually found in it. Large quantities of Nabataean painted and plain ware were strewn in and around the workshop. The establishment was in operation for about one hundred and fifty years—from 40-30 B.C. to the first decade of the second century of our era. These dates are confirmed by the coins, lamps and impressions on imported *terra sigillata* found with the local pottery.

ANCIENT AUTHORS TELL US that the caravan trade was

Bronze leopard, artistically the best object found in the excavations. The spots contain black paste inlay. Height 2 in.

the Nabataeans' main occupation. Nearly all of the Indian and Arabian spice trade was in their hands. Yet, on the basis of a number of Nabataean inscriptions which were deciphered in the course of our work, it may be stated with absolute certainty that the people of Avdat had actually started some kind of farming, adapted to the specific conditions of the arid Negev.

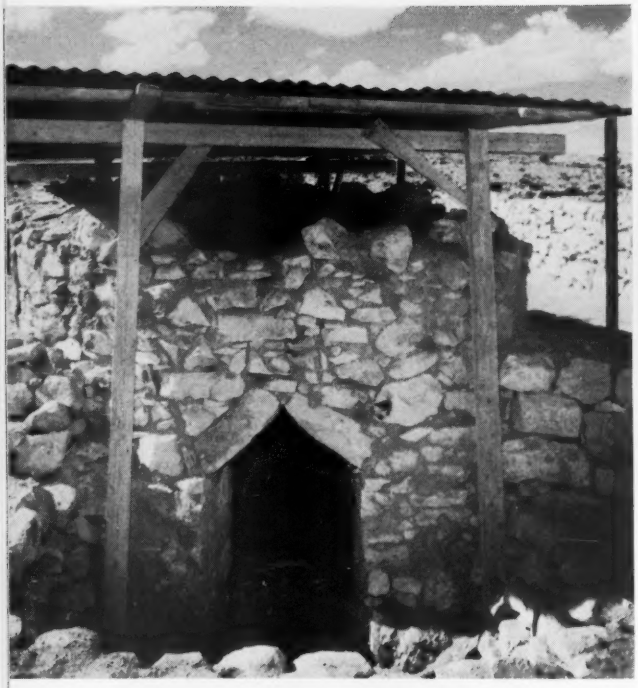
These inscriptions were engraved on six large libation altars, 3-5 feet long and 2-3 feet high. Four of these were found *in situ,* adjoining dam systems built in the valleys near Avdat. The inscriptions record dedications of the water system. They state that dams were built by a group called Bnai Sarutha, under the leadership of a man named Garmo, between the eighteenth and the twenty-eighth year of the reign of King Rabel II (A.D. 88/89-98/99).

The rule of the independent Nabataean kings was abruptly brought to an end in A.D. 106 by the kingdom's annexation—generally presumed to be peaceful—to the Roman Empire, under the emperor Trajan. The peaceful transfer of government did not, however, apply to Avdat, which was entirely destroyed in the process. A very thick layer of ashes was reached wherever the spade penetrated the latest Nabataean stratum in the acropolis area. A great many bronze figurines, bronze and clay lamps, gold jewelry and painted pottery were found in the ruins of the staircase. Some of the inscriptions mentioned above were also found in this context. The destruction in Avdat is clearly dated by some of the objects found.

The second century and the first half of the third may be called the "Dark Age" of Avdat. During this period the city was presumably in ruins. The once cultivated valleys were now left to herdsmen. These left their imprint in the Thamudic and Safaitic rock inscriptions and engravings still to be seen in the vicinity of Avdat.

Renewed building activity started in Avdat about the middle of the third century. According to several Greek inscriptions, a temple was dedicated in A.D. 268 to Zeus-Obodas, the deified Nabataean king, and to Aphrodite. The edifice was faced with marble, as another inscription tells us. These inscriptions were not found *in situ* on the acropolis, but in the ruins of later buildings.

The new Avdat, built in the later decades of the third century, was erected on the northern part of the plateau. It consisted of the acropolis and a very neatly planned residential quarter. According to a dated inscription found *in situ* in one of the public buildings, this quarter was completed in A.D. 294. The inscription states that the mason was a resident of Petra.



One half of a lintel of the third century A.D. (the other half was discovered later) which bears five Greek inscriptions. On the *tabula ansata* is the date of dedication of the building, presumably a temple—162 (A.D. 268), and the name of one of the dedicators, Soaidos. Along the lower edge is a line reading ΠΑΣ ΦΙΛΩΝ ΟΒΟΔΑ (all the friends of Oboda).

Left: **The potter's kiln,** the source of Avdat's Nabataean ware, which was found practically intact.

Avdat continued

A large burial cave on the southwestern slope of Avdat, which has long been known, must be attributed to this period. E-Nusra cave, as it came to be called in the literature, used to be attributed to the Nabataean period. Some scholars even identified it as the burial place of the deified king Obodas who, according to a short text of the first century A.D., was revered at Avdat and buried there. Excavations now being made in the vaulted antechamber and the dump adjoining the cave indicate, however, that the burial place belongs to the mid-third century. Two beautiful Greek epitaphs are now being deciphered. The date of a third inscription, discovered while this was being written, is A.D. 242. The names of the people mentioned in these inscriptions—Amlaifos, Moulche, Ofraina, Abdomaios, Abdomanchos, etc.—cast doubt on their identification as Nabataeans. One may expect some surprising information from excavation in this area, which is still at an early stage.

There was no apparent gap between the Late Roman and Byzantine periods. The transition from paganism to Christianity is, however, quite obscure.

IN THE BYZANTINE PERIOD the acropolis area underwent major changes. The pagan buildings were dismantled; their magnificent architectural elements and nicely drafted stones fell prey to the Byzantine masons. The retaining walls, probably shattered by a strong earthquake, were repaired by adding a second, rounded wall, screening the original one. A new staircase was constructed at the northwestern corner of the acropolis to replace the Nabataean one. A church—the so-called "Northern Church"—with a baptistery attached, was erected nearby. The church is of the usual basilica type. It has a single apse, with a bishop's *cathedra* right in the center. It had a *diaconicon* to the right of the apse, but no corresponding *prothesis*. The square base of a preaching pulpit, or *ambo*, is in front of the *schola cantorum*, at the left side of the apse. Many of the elements of the Nabataeo-Roman temple mentioned above were found imbedded in the walls and floors of this church.

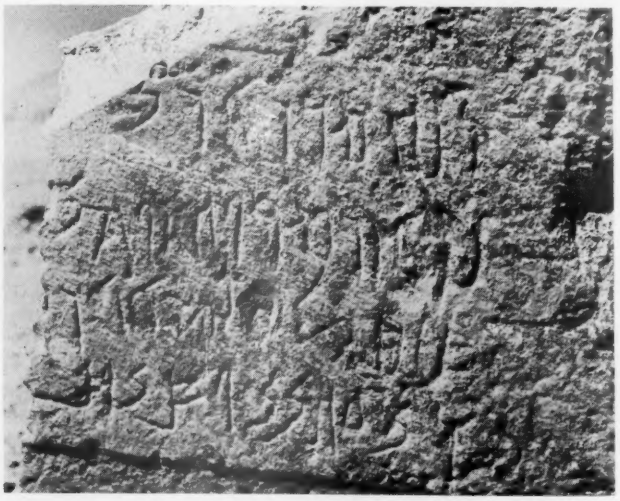
A new church—the "Southern Church"—was constructed in the middle of the sixth century, on the south side of the acropolis. This was a large and sumptuous edifice containing a central apse and two very small side apses behind the *prothesis* and the *diaconicon*. Here the base of the preaching platform is rounded. The chancel screen which separated the eastern part of the church from the nave could be reconstructed from the elements

The church of St. Theodore as it looked before clearing. All but the posts of the main entrance and the upper part of an apse was covered when the excavators began their work.

Below: **The same church,** restored. The chancel posts, the screen at the east of the left aisle, the arches of the *prothesis* and the *diaconicon* were all found *in situ*. The upper slab of the altar was found in fragments in the *diaconicon*. The upper part of the main entrance has been reconstructed. The capitals, which were found nearby, are of the so-called "Petra style." These belonged originally to an earlier, pagan building.

One of a score of Greek inscriptions found in St. Theodore's church. This one is the tombstone of Zacharias, son of Erasinos. Like five others, it records chronological details: the year, month, day of the month, day of the week and hour of the day of the death and burial.

Wall painting in a Byzantine cave. On the right are two saints; the lower one has killed a serpent. In between is a much smaller man standing near a camel, his hands raised in prayer.



Nabataean inscription on a libation altar, six of which were discovered in the valleys comprising the agricultural territory of Avdat, near one of the dam systems. It reads: This dam (system) was built by Garmo and his companions, in the year XVIII (A.D. 98/99) of our lord Rabel, who brought life and deliverance to his people.

Avdat from the west. In the foreground a fruit-drying installation, with a dug-out storage space in the center of it.

Avdat continued

found *in situ*. In the side rooms there were traces of frescoes representing saints.

Six dated inscriptions supply most valuable information. We learn from one of them, bearing the date 541, that the church was dedicated to St. Theodore. The latest among the dated inscriptions, engraved in 618, is the tombstone of a certain Kapito, the son of Erasinos. This man is described as the head of a monastery. The church seems to have been the property of a family of priests.

The eastern half of the acropolis was occupied by a large fortress erected during the sixth century. It had eight towers, one at each corner and one in the middle of each side. Two main gates were situated in the north and south walls, and three secondary entrances were provided in the other walls. A chapel was built adjacent to the northern corner of the fort. Two large cisterns with a complicated canal system supplied the necessary drinking water. Parts of the walls defending the citadel were found in perfect condition, standing twenty feet high.

The Byzantine town, which extends along the western slopes, is of a type rare in the Middle East. It consists of four to nine terraces, depending on the topography, on which were built houses, attached to artificially excavated caves behind them. There are about four hundred of these caves. Yet the Byzantine population should by no means be considered as troglodytes. The public buildings and the spacious living quarters point to a comparatively high standard of living. In my opinion, these caves were never used as living quarters, because of the lack of an efficient ventilating system. Nor, as some scholars have suggested, were they Nabataean burial caves, as the pottery found in them shows. Enough evidence is available to suggest that the caves were used for various purposes. Some undoubtedly served as storage facilities for the wares transported from the Red Sea to the Mediterranean via Avdat. Some of the caves, at least, were used for processing the local vintage. One is definitely a wine cellar. The three wine presses discovered at Avdat prove the existence of viticulture and local wine production.

ALMOST A MILLENNIUM of Avdat's existence—covering the Nabataean (third century B.C. to early second A.D.), Late Roman (middle of the third through the fourth century) and Byzantine periods—came to an end in the year 620. The Persian army of Chosroes II—to which Jerusalem fell prey in 614—pushed constantly southward. This is indicated by the remnants of destroyed churches and is supported by the literary evidence. The marauders reached Avdat in 619 or 620 and sacked the city. An extremely thick layer of ashes and partially

A deep gorge which is part of Nahal Zin canyon. In the center of the picture can be seen a pool which is formed by one of two small perennial springs.

Avdat continued

burnt roof beams found in the two churches, the monastery, the citadel and practically everywhere on the acropolis constitute ample proof of their presence.

The few years separating the Persian invasion from the Arab conquest of 636 were marked by sporadic rebuilding. Some small rooms were constructed on the remnants of the colonnade in the atrium of St. Theodore's church, and a little chapel was built in the citadel. Nevertheless, Avdat was doomed, particularly since the *raison d'être* of her existence—the Red Sea-Mediterranean trade route crossing southern Palestine—was rapidly losing its importance, and the main route to the Mediterranean, now completely dominated by the Arabs, was moved to Egypt. The process of attrition, as it affected Avdat, has been brought to light by excavations in the Byzantine houses. It is clear that family after family packed its belongings and moved to some other place. The Arab conquest, which was by no means destructive, only accelerated this process. Once the main reason for the existence of this city disappeared, it just faded away.

By the eighth or ninth century all was over. Practically all the inhabitants had left. The dams and the cisterns were no longer in use. The houses fell into disrepair, and later on were shattered by earthquakes. The constantly blowing desert winds precipitated an inch of dust each year, and in the course of centuries covered almost everything with a thick layer. This efficient dust cover, twelve to fifteen feet thick, left the ruins almost intact, awaiting the archaeologist's spade.

THE AUTHOR, who was born in 1923, became in 1942 a member of Revivim, the first Jewish outpost in the central Negev. He devoted his spare time to what was at first just a hobby—the history of ancient agriculture and the archaeology of the Negev. In 1953 he began formal studies at the Hebrew University, Jerusalem, and participated as a student in excavations at Beth-She'arim, Masada, Hazor and Caesarea Maritima. He received the B.A. in 1955, the M.A. in 1958. Mr. Negev is now in charge of excavations at Avdat as well as at the Crusader town at Caesarea.

PREHISTORIC SCULPTURE

from the Columbia River

By Emory Strong

IN FEW AREAS in the United States has there been such a dearth of archaeological research as along the Columbia River, where there is such a wealth of material. The prehistory of man on the Columbia River is extremely complex. Along the Long Narrows, near The Dalles, Oregon, a team from the University of Oregon under the direction of Dr. L. S. Cressman excavated, layer by layer, through nearly thirty feet of refuse, a site continuously occupied for over ten thousand years. The upper levels contained modern trade goods; the lowest was dated by the Carbon 14 method at 9,780 years ago. Since this date is from a composite layer, the bottom level may be as much as eleven thousand years old. Now most of the ancient villages are lying deep beneath the waters, behind the dams which have harnessed the vigorous Columbia.

During the terminal stages of the Ice Age a tongue of the glacier extended far into Idaho, blocking the drainage from the melting ice until a great lake was formed that covered Montana and parts of nearby states. Eventually the weakened ice dam failed, releasing a cataclysmic flood that surged across the lowlands and poured through the Columbia River gorge a thousand feet deep, sweeping all life before it. Sparse evidence shows that man lived along the river before this disaster, called the Spokane Flood. After the waters receded, man slowly began again to settle near the river; the earliest arrivals were hunters and food-gatherers who left crude percussion-chipped tools to mark their presence. As the population grew, the artifacts lost in the refuse heaps increased in number. From the stagnant pools and backwaters of the river, birds were captured with the bola. Game was slain with stone-tipped darts hurled with the *atlatl*. Fishing was important, as was the gathering of seeds and berries.

About seven thousand years ago, the weather gradually grew warmer and drier, finally desiccating the lakes and marshes of the Great Basin, where an extensive population seems to have existed, and forcing them to migrate to more favorable areas. Undoubtedly some of them found their way to the Columbia, and perhaps even to the Pacific shore. During the hot, dry altithermal period, which lasted about 3500 years, life along the river seems to have been barely at subsistence level; the population did not increase nor did the culture expand. As the weather moderated, however, the increase in population became rapid. Carved stone appeared, and well made pressure-flaked points. The rich Columbia River culture was in its formative stages.

From still inadequate archaeological investigations made along the river it appears that this prolific culture was well established about 1200-1500 years ago and reached its apex 400-800 years later; by the time of the European invasion, or soon after, it withered and died. The culture was completely prehistoric and untouched by European influence, unlike the better known Northwest Coast cultures, which produced monumental zoomorphic and anthropomorphic sculptured forms.

The cause of this people's artistic decline is unknown. There is no evidence that they were overrun by invaders. The artifacts found with burials attest to a fairly peaceful existence, for weapons are rare and have the appearance of symbolism rather than utility. Unlike the Aztec and other American civilizations, the Columbia River

1. Handle of stone maul or pestle, in the form of a human head. Broken off at the bottom. Height 3 in. McLeod Collection.

2. Maul of black basalt with three interlocking faces. Length 9 in. Klindt Collection, Maryhill Museum of Fine Arts, Maryhill, Wash.

3. Mortar made of lava, decorated with an owl's face and a scalloped rim pattern. Height 8 in. Gammon Collection, Maryhill Museum.

Prehistoric Sculpture continued

culture harbored no highly stratified society. In cemeteries utilized over long periods by specific tribes addicted to interment of the possessions of the deceased, any burial may contain grave goods, but none is furnished with an unreasonably large amount. The objects in the graves are mostly of stone, with a few of bone. It is known that wood was used to a large extent for artistic expression. Shell, feathers and fiber were also utilized and, occasionally, unfired clay. These materials have nearly all disappeared over the ages; their use probably exceeded to a large extent that of stone. Thus the urge to create may not have disappeared; instead, it may have been gradually transferred from stone to a perishable medium.

Great landslides along the river which produced rapids, such as the Cascade Rapids, must have affected the economy and hence the entire culture, by disrupting the salmon runs on which the natives depended for their

existence. The coming of the horse about 1720 caused another cultural upheaval, with increased mobility which must have resulted in greater inter-tribal contact. And of course the white man's diseases, introduced about 1780, spelled disaster: by 1835 over three-quarters of the natives along the lower river had perished, and these once powerful nations were forever destroyed. No white man ever saw the natives of the Columbia in the full glory of their culture.

THE COLUMBIA, a young, energetic stream, enters the state of Washington from Canada near the Idaho border. From there it flows southward, then sweeps north and west in a great bend, forced against the granite hills by the Miocene Age basalt flows. Through these lavas it cuts a narrow channel to emerge into the semi-arid plains of Central Washington and Oregon near Priest Rapids, flowing south and then west to the Pacific Ocean through a deep gorge extending through the Cascade Mountains. There are two distinct climatic areas, the rain-washed hills and forests west of the Cascades and the dry plains to the east. Each area had a separate culture adapted to the region, yet both were dependent on the salmon. To the east the people were partially nomadic, roaming from berry fields in the mountains to the prairies for harvesting roots, and always to the river in the salmon season. To the west the natives lived in large permanent villages, in houses built of split cedar planks.

The two cultures met at the Long Narrows of the Columbia, site of the village Wishram of Washington Irving's *Astoria.* Astride the only water level pass across the mountains between Canada and California, Wishram became the great trade mart of the West, as well as the most important fishing site. At the Long Narrows the Columbia, in volume second only to the Mississippi, was forced through a vertical walled channel in the dense basalt, less than two hundred feet wide and over three hundred feet deep. The violent currents forced the salmon to seek channels and eddies, where they were easily netted or speared.

The natives met at Wishram as much to trade, gamble and fraternize as to fish. The mixing of cultures and the large population have made this place one of the richest archaeological areas in the United States, and it is here that most of the better specimens of primitive art have been uncovered. The style is characterized both by originality and by mechanical precision. Small bone amulets and effigies are greater in number, and antler and stone are carved with more diversity of style and mastery of technique, than in the lowlands to the west, where sculpture depended more on scale and boldness for its impact. In the lowlands grew the cedar, that useful wood from which the natives constructed and furnished their houses and canoes, and with which they expressed their aesthetic impulses. Consequently, fewer stone objects are found west of the Cascades, but those that do appear are noted for their developed style.

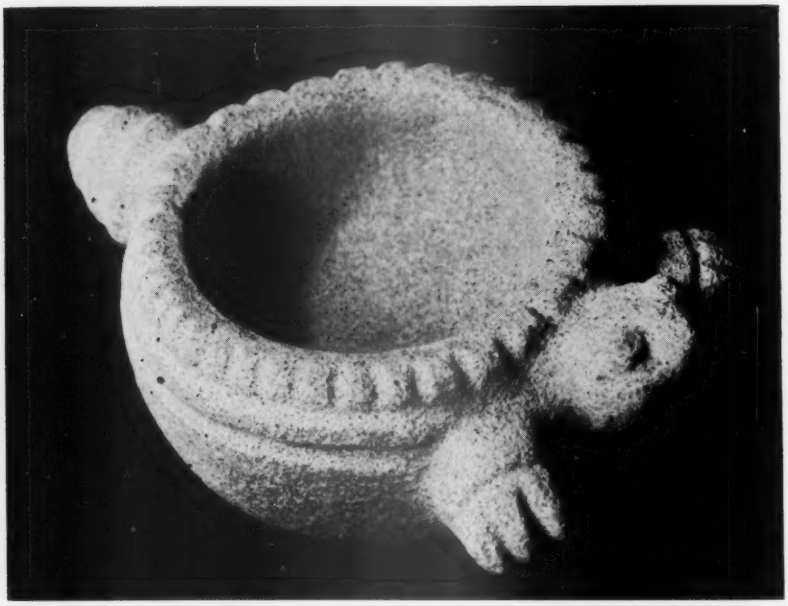
THE ART STYLE of the Columbia River has distinctive features which readily identify it. While each of these features may be found in other primitive art, their combination here is unique, and attests to a long and progressive development. The most characteristic element is the exposed skeleton motif. The bulging eyes and prominent brow ridge, as shown in a maul handle (Figure 1), are typical. Other stylistic elements, besides the over-all massiveness, are an elaborate headdress or ornamentation, the crescent mouth or "grinning face," or the portrayal of a single significant feature, such as the eyes alone. Some carvings, especially those on antler and bone, have intricate interlocking designs.

The artistic impulse of primitive people is usually expended on the embellishment of utilitarian objects, and on the Columbia there are many examples of this motivation. Hand mauls, used for driving wedges to cleave wood for use as planks or fuel, are highly polished and frequently carved into stylized or conventional zoomorphic forms. On the upper river, in the semi-arid regions east of the Cascade Mountains, the maul was the favorite article and in some places almost the only one on which aesthetic effort was expended. The maul shown in Figure 2 is an example of this type of expression. It is made of dense black basalt, ground and polished until it glistens. On the handle end are three interlocking faces, carved with a technical skill indicating high artistic development.

Nearly all stone mortars from the Columbia have some decoration, if only rim delineation or geometric design. Unfortunately, the natives of the West possessed no pottery, that useful medium by which the sequence of artistic development can be followed. Instead, besides the stone bowls, they used baskets, made waterproof by superb weaving, and wooden bowls for cooking by the hot stone method. The high development of the art of basket-weaving at the time of the European invasion indicates a long tradition.

An example of massive art style adapted to a utilitarian object is shown in the lava mortar in Figure 3. Two of the stylistic elements of Columbia River art are evident, the bulging eyes and prominent brow ridge. The rim pattern emphasizes the outline, and leads the interest skilfully to the main feature. The interior of this bowl shows extended use.

A different artistic treatment is shown in a mortar carved of granite (Figure 4); the skill of the artisan who created this masterpiece was superb. The uplifted



4. Granite mortar in form of turtle. Diameter 7 in. Strong Collection, Maryhill Museum.

Prehistoric Sculpture continued

head and projecting forefeet suggest animation. The regularly spaced features are balanced by the protruding tail, and elimination of the back legs enhances rather than detracts from the feeling of motion. This bowl was found on the river's edge, washed from the bank, and many artifacts are found in the same way by diligent searchers of its shores; in fact all of the objects shown in this article were discovered by amateurs.

The most highly developed utilitarian art appears on small mortars, known locally as "paint pots" on the assumption that their primary function was as a receptacle for grinding paint. While some may have been so used, most are not suitable for the purpose. Some are too deep, while others are made of porous stone. Their most probable use was for mixing the potions and herbs used by the local shaman in his rites. The almost incredible amount of work expended on them would imply ceremonial use.

The carving in bas-relief—rare in the art of this region—shown in Figure 5 is made of lava; considerable skill in handling a difficult medium is demonstrated. This was probably a ceremonial mortar. A beaver with broad tail is represented; both side and top views are shown in the same plane. The rim design skilfully fills the voids but does not detract from the emphasis on the face or create unbalance at the tail. Like most pieces found in cremation graves, this one has been broken—"killed"—in order to release its spirit to follow the departed owner.

WHAT IS PROBABLY THE FINEST SCULPTURE yet found along the Columbia is the standing owl shown in Figure 6. While retaining the characteristic solemnity of its living model, it imparts a feeling of vigor; the poised wings and prominent features radiate life. The quality of the carving is excellent. The polish masks the character of the stone so that its type cannot be determined, but it is dense and hard. The tiny bowl in the back appears to be symbolic rather than of practical use. The

6. Stone owl, highly polished. The side view shows the small bowl in the owl's back, which was probably symbolic rather than practical. Height 5 in. Krussow Collection.

5. Lava mortar, probably ceremonial, representing a beaver. Diameter 18 in. Leachman-St. Clair Collection.

"flat face" style of this figure is unusual, and serves to illustrate the originality and diversity of the local art. The eyes and mouth may have been inset with shell or mica. This figure was found in a cremation pit at a depth of six feet. Most of the better specimens are found in these pits, or with inhumation burials which lie just beneath them. Cremation is presumed to be a fairly recent trait along the river, and the cremations overlying inhumations indicate a change of burial practices within the same culture. This carving probably dates between 400 and 800 years ago.

The owl, as in many other places, was the favorite subject for portrayal along the river. One form is called a "Spedis Owl," after a prominent local Indian; it appears in numerous petroglyphs on the cliffs along the Long Narrows. Frequently only the eyes and beak appear on the petroglyphs, and on mortars such as that shown in Figure 3.

Figure 7 illustrates both the non-utilitarian artistic conception and the bold style found along the lower river. This seated owl was found on Sauvies Island near Portland, Oregon. The dignity of the owl has been admirably captured by the prehistoric sculptor; the bird has the appearance of a pompous judge about to render an important decision. In this specimen the feeling of vigor and dignity is imparted by sheer boldness, without refinement of detail. By contrast the owl in Figure 6, from the upper river, obtains the effect by symmetry and perfection of workmanship. Figure 8 shows a less detailed treatment of the owl, still retaining the expression of dignity.

Two types of clubs are shown in Figures 9 and 10. The former is of whalebone and shows one typical decoration of this type of weapon; the latter is a bird effigy carved of basalt. It was made to be used with a wooden handle; the groove separating the head and body serves for its attachment.

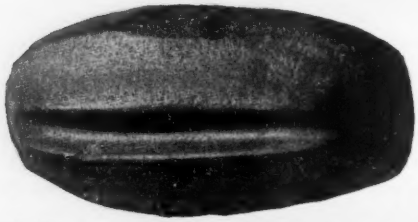
Pure geometric design is represented by the bowl shown in Figure 11, carved of mountain sheep horn. By steaming, this material could be bent and formed into

7. *Left:* Stone carving representing a seated owl. Height 15 in. Oregon Historical Society.

8. *Below:* Owl carved out of stone. Height 3 in. Klindt Collection, Maryhill Museum.

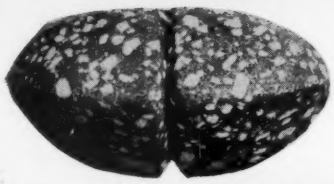
9. *Right:* Whalebone club with two-faced human head. Harrison Collection, Maryhill Museum.

10. Stone head of a war club to which a wooden handle was to be attached. Length 6 in. Alexander Collection, Maryhill Museum.



12. Stone arrow-shaft straightener, which was heated for use. Length 3½ in. Klindt Collection, Maryhill Museum.

11. Bowl with incised geometric designs, carved from mountain sheep horn. Height 5 in. Martha Ferguson McKeown Collection.



13. Atlatl weight of variegated stone. Length 2½ in. McLeod Collection.

14. *Left:* Arrowheads chipped from semi-precious stones. *Right:* Tube pipes of steatite. *Below:* Net gauge made of antler.

Prehistoric Sculpture continued

almost any shape, and it was extensively used for dishes and spoons, which were seldom decorated with other than simple designs.

Some of the utilitarian objects depend on form alone for their aesthetic expression. One of this type is an arrow-shaft straightener (Figure 12). So-called atlatl weights (Figure 13) are carefully finished; they are always made of highly colored stone, and beautifully formed and polished. While there is no direct evidence that these particular stones were used as atlatl weights, they are similar in shape to stones known to have been so utilized. All were grave offerings, indicating a symbolic use.

The famous Columbia River gem points (Figure 14) are made of semi-precious agate, opal and petrified wood. Not only was the most beautiful stone used, but they were chipped to display the color and grain to the best advantage.

The Columbia River tube pipe (Figure 14) is also known for its artistic form and excellent workmanship. Occasionally one is carved with geometric or anthropomorphic designs, and many show wear from extensive use. Unfortunately, most pipes have been "killed" or badly burned in cremations.

The Columbia, once a rapid stream sustaining a large native population on its shores, is now a series of stagnant pools behind monumental dams. Before the river was tamed its flow fluctuated widely, washing many artifacts from its banks, and the violent winds that sweep up the gorge uncovered others from the moving sands. Few indeed will now be the art treasures uncovered, until some time in the far distant future when the pools are drained and the sediment eroded.

A GRADUATE of Oregon State College, the author is an engineer by profession, an amateur archaeologist by inclination. He has been president of the Oregon Archaeological Society and editor of its publication, *Screenings*. Along the shores of the Columbia River he has photographed hundreds of petroglyphs and pictographs, most of which are now under water or destroyed. Mr. Strong has traced old village sites mentioned by early explorers and has participated in several excavations. His book, *Stone Age on the Columbia River*, appeared in 1959.

ARCHAEOLOGICAL NEWS

Louise Taft Semple

We announce with regret the death of Louise Taft Semple on March 27, 1961. With her husband, William T. Semple, Professor Emeritus of the Department of Classics of the University of Cincinnati, Mrs. Semple was active for many years in forwarding archaeological work. Most notable was the Semples' participation in and subsidy of the University of Cincinnati's excavations at the site of Troy. Among their many benefactions was a sum contributed in order to help establish ARCHAEOLOGY.

Besides being a Benefactor of the ARCHAEOLOGICAL INSTITUTE OF AMERICA, Mrs. Semple was Vice-President from 1923 to 1953.

Romans at Worcester

Roman portrait sculpture has been the subject of an important exhibition this spring at the Worcester Art Museum. Thirty-six outstanding Roman portrait busts and twenty-six Roman coins were brought together in an installation especially designed to emphasize the intensely individual character of each of the heads.

Twenty-five museums and private collections throughout the United States and Canada contributed their choice Roman pieces to this exhibit; the span of time covered began with the first century before Christ and concluded with the division of the Roman Empire in A.D. 395. Emperors and empresses, tyrants, conquerors and unknown Romans were all represented in the exhibition. One of the pieces—an interesting portrait of a woman with a removable coiffure of black marble—is illustrated here. The features show the characteristics of the early third century of our era.

An illustrated catalogue has been prepared by Michael Milkovich, staff member of the Worcester Museum. In connection with the exhibition a two-day seminar on Roman art, literature and history was held, featuring talks by five eminent Classical scholars.

Head of a woman, early third century. Lent by The Detroit Institute of Arts.

An Obelisk is Raised

From Cairo, Egypt, comes an interesting eyewitness account of the raising of an ancient obelisk in a public square of the modern city. With the permission of the American Research Center in Egypt we quote (in slightly abbreviated form) the following letter from Mr. Nicholas B. Millet, Fellow of the Center:

A feat of engineering that took place recently deserves to be reported for its antiquarian interest. This involved the erection of one of the Tanis obelisks of Ramesses II in a Cairo park. Months were spent in determining the most advantageous and picturesque location for the monument. A full-scale model made of linen stretched over a frame of lathes was moved all over Cairo, and photographs were taken from every side at each spot. The dummy obelisk appeared first in the great Liberation Square, between the Museum and the Nile-Hilton Hotel, and then at a succession of beauty spots in the elegant and expensive garden quarter of Zamalek. Finally it disappeared, and work began on a foundation for the real monument at a point on the island just opposite the Hilton Hotel. I was curious to see exactly how the project would be carried out here in Egypt, where heavy machinery (although widely used in industry) is still rare enough so that much heavy work is still done as in ancient times.

Many of the engineering methods of the ancient Egyptians remain a puzzle, and no part of the puzzle is more difficult to solve than the question of how they managed to raise obelisks into position. A great deal of scholarly speculation has been expended on the subject. The most intelligent and widely accepted theory to date is that put forward by Engelbach in *The Problem of the Obelisks.* Engelbach's suggestion is that it would have been very difficult actually to *raise* such a long and heavy mass to a vertical position, and that an obelisk must in fact have been *lowered* into place. He presumes that a high ramp was built, with a steep cliff-like drop at the end of it. The obelisk would be hauled up the slope and gradually let down from the high end to the waiting pedestal below, which would be buried beneath a heap of loose sand held in by containing walls. The sand would be slowly removed by other gangs of men and the great monolith would gradually settle into place.

Since it is not often that one gets the chance to watch an obelisk being erected, I set off eagerly for the scene of activity, a small public park on the east bank of the Gezireh. The obelisk lay on its side on the trampled lawn, enclosed in a crib of steel, and looking as stubbornly immovable as a mountain. Although not large as obelisks go (the great obelisk in front of the Lateran in Rome is more than thirty

meters tall, about twice as large), this example posed a difficult engineering problem because it was in two pieces, having broken across the middle when it fell during an earthquake ages ago. The fragments had been joined again by the modern masons, but the repair meant a serious weak spot necessitating a framework of steel.

The designated spot for the erection of the obelisk was the raised river bank. A great notch had been excavated in the dike down to the level of the park, and a temporary concrete base had been laid at its bottom. This puzzled me until I saw that the engineers were planning to follow Engelbach's theory of the ancient technique by using the bank itself as a construction ramp from which they could lower the obelisk into place. A gang of twenty men or so, aided by two distressingly modern steel winches, dragged the prostrate obelisk in its steel cage on rollers up the sloping inner face of the dike. A great deal of singing and shouting accompanied the work. Finally the obelisk lay along the top of the embankment, with its butt pointing in the direction of the prepared notch. To the accompaniment of more noise, the gang dragged it along until the end overhung the lip of the notch. Since the workers were equipped with strong winches with brakes, the sand fill which the ancients used was not necessary, and twenty men could handle what would have required five times as many in pharaonic times. Gradually the butt was lowered and the tip raised, while baulks and wedges of timber and iron were packed beneath the rising portion to add support. Soon the butt rested on the base, and further cranking and packing brought the shaft to a vertical position. All the essentials of the ancient technique had been employed in the operation, and the only twentieth-century note had been the substitution of winches for the huge gangs of men who had erected the monolith in its original setting in the great temple at Tanis. I went off home in the snug glow that affects any self-respecting archaeologist when he sees a survival of the past holding its own in the present. It proves what he has always secretly believed—that they did things better in those ancient days.

Recent Finds in Lucania

To the kindness of Professor P. C. Sestieri we owe the following account of interesting recent finds in the territory under his administration. The actual report was prepared by Professor A. W. Van Buren.

A hitherto unrecognized archaeological site, Pontecagnano, some ten kilometers southeast of Salerno, Italy, proves to possess two extensive burial areas. One, at which cremation was practised, belongs to the First Iron Age (Villanovan), while the other, where inhumation was the rule, is of the Orientalizing period, the early seventh century B.C. The former included one of the most elaborately decorated biconical handmade cinerary urns imaginable, together with its lid in the form of a cap-helmet, each showing a variety of motifs incised or stamped with great skill, while the other graveyard yielded a large wheelmade "fruit-stand," its rim enlivened by two geometric figures of horses balanced about the middle one of three handles (both vases illustrated here).

An entirely different interest attaches to the news from Velia (Greek Elea), a historic site already known to readers of ARCHAEOLOGY through Professor Sestieri's article (10 [1957] 2-10). Here the Dottoressa Maria Sestieri-

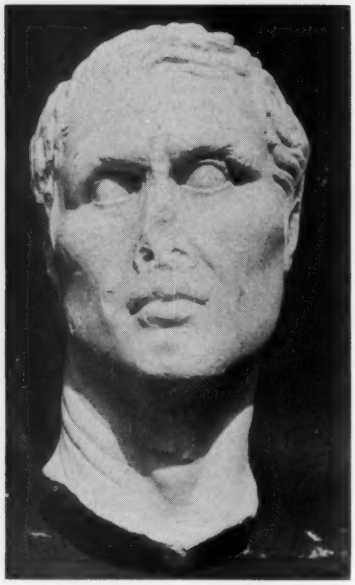
Pottery "fruit-stand" from Pontecagnano.

Bertarelli has been conducting further campaigns of excavation, in which she has almost completely cleared a remarkable establishment consisting of a sunken portico enclosing a rectangular space which might well have been planted with trees and verdure in antiquity; the evidence of numerous pieces of sculpture, including an over-life-size female head, probably a Muse, suggests that this was the seat not only of a guild of physicians, attested by three Greek inscriptions, but, we suggest, of devotees of the Muses in general—a *museum* in the Greek meaning of the word.

The comparatively early date of this

Velia: entrance to newly discovered cryptoporticus.

Biconical cinerary urn found at Pontecagnano.



Portrait of Menander found at Velia.

environment, in the first century B.C. —there are probable portrait heads of Augustus and Livia in their earlier years—lends interest to the marble portrait head here reproduced. This exhibits all the features characteristic of the forty-two or more known replicas of a type identified as Menander—a highly individualized structure of bone and sinew, with noble forehead and prominent cheekbones and jaw; the indications of advancing middle age and the inroads of ill health, especially in the sunken eyes and cheeks; a wrinkled throat; a prominent Adam's apple; and, most of all, the highly individualistic treatment of the hair.

This addition to the list of portraits of the chief exponent of the New Comedy of Athens is particularly welcome at a time when the papyri have yielded a considerable portion of his literary productivity, and interest has been kindled afresh in this highly bred, sensitive thinker, brooding over the tragicomedy of human life, whose spirit has been so effectively reproduced by the sculptors.

Council Meeting in Prague

The permanent Council of the International Union of Prehistoric and Protohistoric Sciences held its biennial meeting in Prague, Czechoslovakia, on July 22 and 23, 1960. About fifty members attended, representing twenty-one countries, chiefly European.

One of the main items of business was the election of a president, as the result of the regrettable death early that month of Professor Alberto C. Blanc, who had been elected president at the Congress of 1958. Professor M. Pallottino of the University of Rome was elected to this office.

A report was made on preparations for the next Congress of Prehistoric and Protohistoric Sciences, which is scheduled to be held at Rome August 29-September 3, 1962. The last one, as our readers will remember, took place at Hamburg (1958), and was a brilliant affair attended by nearly seven hundred individuals from forty-nine different countries.

COWA Surveys

Archaeologists and specialists in allied subjects are finding most useful the *Surveys and Bibliographies* currently published by the Council for Old World Archaeology. Founded several years ago by the late Lauriston Ward, the Council is concerned chiefly in aiding scholars to keep abreast of the latest activities and publications in the prehistory and archaeology of the Old World.

Series I of the *Surveys and Bibliographies* appeared in 1958 and 1959. Twenty-two areas were covered, the same number which will be included in Series II. Each report covers the last two or three years of archaeological activity in one area, and consists of a survey of current work as well as an annotated bibliography of the more important books and articles.

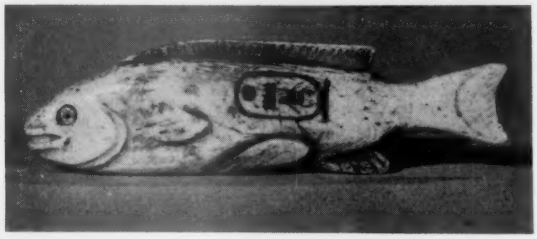
Egyptian Art at Richmond

A notable collection of Egyptian antiquities belonging to the Virginia Museum of Fine Arts, Richmond, Virginia, is now being exhibited for the first time in a gallery especially designed for the purpose. The new installation coincides with the celebration of the Museum's twenty-fifth birthday.

The most striking feature of the exhibition is a tomb of the First Intermediate Period (VIIth-Xth Dynasties, 2258-2052 B.C.) which has been installed so that the visitor has a view down into the tomb, where the furnishings are arranged as they might have appeared at the moment of discovery. Vessels of food, jewelry and personal items for use in the next world are set out beside the wooden coffin of Theby. This coffin, inscribed with the owner's name in polychrome hieroglyphs, was excavated at Sheikh Farag, on the east bank of the Nile, south of present-day Luxor, by the Boston Museum of Fine Arts expedition of 1923, and subsequently was purchased by the Virginia Museum. It is one of relatively few coffins found with the lid unopened and the mummy undisturbed inside.

Among other objects in the Egyptian gallery, which contains the largest collection of this kind in the South, are statues and bas-reliefs, jewelry, scarabs and wooden models.

Left: Wooden coffin containing mummy of Theby. *Right:* Ivory fish with engraved cartouche of Mem-khaper-re (XVIIIth Dynasty).



Just out are fascicles on the British Isles, Central Europe, Eastern Mediterranean, Northern Asia and Indonesia.

The 1958 and 1959 *Surveys* can still be obtained at $4.00 for each year. The 1960 and 1961 *Surveys* are $7.50 each. Single area *Surveys* may be ordered for $1.00 each. Address: Council for Old World Archaeology, 11 Divinity Avenue, Cambridge 38, Mass.

Interrelationships of New World Cultures

In 1958 a most important research program was begun under the direction of the Institute of Andean Research. Its purpose is the study of interrelationships among New World cultures. The following account of its inception and organization is adapted from Charles R. McGimsey's résumé in the *Newsletter* of the Arkansas Archeological Society (December 1960):

The tropical sun beat down on the white walls and spilled over onto the pavements of San José, Costa Rica. In July of 1958 a group of archaeologists seeking a shady refuge during a break in the meetings of the 33rd International Congress of Americanists collected themselves about a table on the porch of the El Gran Hotel. Several were staying at the hotel, but the rest of us simply were members of a casual group that had come in together from the University where the meetings were centered—a group held together by an animated discussion of possible contact between the various cultures of Mexico and Peru. Had the elaborate cultural developments of the Mayas and Aztecs of Mexico grown independently of and without any contact with the equally complex if distinctive cultures of Peru? Had there been trade or other contact between them? If so, when and between which areas had this contact taken place? Had it been overland or by sea?

The group gathered chairs from odd corners and settled around a smallish table. Mike Coe, who had recently completed a season of field work at La Victoria, a site along the Pacific coast of Guatemala, and Clifford Evans and Betty Meggers, who had been engaged in field work in the Guayas Basin on the coast of Ecuador, each spread out a sample of broken pottery from their respective areas. The pottery was nearly identical! In retrospect the moment was a dramatic one. At the time we were too busy examining and exclaiming to recognize it as such.

Closer study showed that the pottery was, indeed, amazingly similar. One expects potsherds from nearby and contemporaneous sites to look alike, but these samples came from sites approximately 1500 miles apart as the crow flies and considerably farther by any likely route of travel. Yet the conclusion seemed inescapable that the groups of people making this pottery had lived at approximately the same time and that they had been in contact with one another.

Investigations in Central America to date had revealed little evidence of extensive overland trade. Further, close similarity over such a distance implied more rapid communication than migration or even trade overland. Coastwise trade seemed a likely possibility.

The estimated date for these two sites was approximately 1500 B.C. Did this mean that prior to the growth and differentiation of regionally distinct cultures in Mexico and Peru these areas and those between had supported a culture basically similar throughout, and that these people had been in relatively frequent contact? Such an hypothesis was not new, but evidence had been lacking to support it. The conversation grew even more animated and continued elsewhere as members of the initial group came in contact with others at the Congress interested in these problems.

Before the Congress was over a committee had been formed to investigate the possibility of initiating a coordinated program of research along the Pacific coast from Mexico to Ecuador. This program would be designed to investigate the extent and nature of coastal communication, the items and ideas carried, and the resultant effects on the cultures involved. The Institute of Andean Research—a number of whose members had been present that first day—agreed to sponsor and coordinate the research program. Dr. Gordon F. Ekholm, Secretary of the Institute, became the coordinator of the program as well as principal investigator.

The general plan developed is for a three-year program incorporating a series of semi-autonomous archaeological projects linked together by a common goal and coordinated so that their results will be readily comparable. The whole program is to concentrate on coastal areas, hitherto a relatively neglected region. At present the line-up of individual projects, principal investigators, and cooperating institutions is as follows (some projects are of one year's duration, others are longer):

Central Mexico—H. B. Nicholson, Clement Meighan (University of California at Los Angeles).
South Mexico—Gordon Ekholm, Matthew Wallrath (American Museum of Natural History and Columbia University).
Guatemala—Michael Coe (Yale University).
Nicaragua—Gordon Ekholm, Albert Norweb (American Museum of Natural History and Harvard University).
Costa Rica—Michael Coe (Yale University).
Panama—Charles McGimsey III (University of Arkansas).
North Colombia—Carlos Angulo Valdez (Universidad de Atlantico).
Pacific Colombia—Gerardo Reichel-Dolmatoff, Alicia Dussan de Reichel (Instituto Colombiano de Antropologia).
Ecuador—Clifford Evans, Betty Meggers (Smithsonian Institution), in cooperation with Emilio Estrada.

All of the individual project proposals were coordinated into a coherent program by the Institute of Andean Research and financial support was secured from the National Science Foundation.

Dr. McGimsey is now in Panama, working on his part of the project. An account of his experiences will appear in a later issue.

Ancient Greek Furniture

An exhibition of carefully reconstructed replicas of Greek furniture of the sixth-fourth centuries B.C. opened on May 24th in Athens, Greece, at the galleries of Saridis of Athens, Syngros Avenue, and will be on view throughout the summer and fall. There are twenty models, including five chairs, eight tables, one couch and six

Type of Greek chair known as a *klismos*. This modern copy is modeled after one shown on the Stele of Hegeso, ca. 400 B.C., in the National Museum, Athens.

Walnut table with bronze legs cast after an original in the Palermo Museum, Sicily. The design of the table is taken from a kylix of the first half of the fifth century B.C., in the Berlin Museum. This type of table was used from the early sixth century to the fourth century B.C.

benches. These designs were recreated by T. H. Robsjohn-Gibbings, furniture and interior designer of New York.

Forms, details of construction and designs of fabrics as shown in the sculpture and vase-paintings of the period, together with a study of the few existing furniture fragments and the research of such authorities as Gisela M. A. Richter and Caroline Ransom, are the sources for the models in the exhibition.

Though furniture designers of the eighteenth and nineteenth centuries used the early discoveries in Greece as a source of inspiration for their designs, the present exhibition is the first serious attempt to reconstruct the furniture of Classical Greece in the light of modern scholarship and recent discoveries.

Perhaps the great surprise afforded by the exhibition is that the furniture, far from looking remote or archaic, could easily be used today. Among the pieces most notable in their timelessness are two tables, one circular and the other oblong—each with a walnut top and three bronze legs made from a cast of an original Greek table leg in the museum at Palermo, Sicily.

The purpose of the exhibition is not only to recreate Classical Greek furniture. In the foreword of the Catalogue Mr. Robsjohn-Gibbings and Mr. Saridis state their hope that the designers of Greece will find a source of inspiration for contemporary furniture.

Fellowship Awards

Among recent announcements of fellowship grants are a number in archaeology and related fields.

The Ford Foundation has awarded fellowships to:

MARIE FARNSWORTH, for a study of the technical aspects of ancient Greek pottery, and to

CHESTER SPRAGUE, for a study of the prehistoric, historic and contemporary architecture of pueblo-dwelling Indians of the Southwest.

Rome Prize Fellowships in Classical Studies for 1961-62 have been awarded to JAMES J. M. CURRY, CHARLES P. SEGAL and ARTHUR R. STEINBERG.

The John Simon Guggenheim Memorial Foundation has made the following grants:

KENAN T. ERIM, New York University. Studies of the coins issued by the Sicilian city of Morgantina between the fifth and the second century B.C.

WEN FONG, Princeton University. A study of twelfth-century Chinese paintings of Buddhist saints.

ANNE DRAFFKORN KILMER, Oriental Institute, University of Chicago. Studies of the lexical texts of ancient Mesopotamia.

SAMUEL N. KRAMER, University of Pennsylvania. Studies of Sumerian literary texts.

JIM ALVIN SANDERS, Colgate Rochester Divinity School. Studies in the Dead Sea Scrolls.

Among the fellowships awarded by the American Association of University Women Educational Foundation are a number in various branches of archaeology:

ELIZABETH E. BALDWIN, for research on artifacts from the Obion site, in western Tennessee;

SARA A. IMMERWAHR, for study and publication of the prehistoric and Mycenaean pottery found in the Athenian Agora;

JUDITH M. TREISTMAN, for translation and analysis of recent Chinese publications concerning the Neolithic period of Chinese prehistory.

International fellowships have been awarded by the same foundation as follows:

ATIFE DIZER, study of the palaeontology of Turkey;

HELLE SALSKOV, for research on Oriental influences in Greek and Etruscan art.

Eta Sigma Phi, Honorary Classical Fraternity, announces that the recipients of summer scholarships for study abroad are: WILL WHITE DE GRUMMOND, to study at the American School of Classical Studies at Athens; MARIANNE JANSEN, to attend the American Academy at Rome.

REVIEWS OF RECENT BOOKS

CRETE AND MYCENAE, text by SPYRIDON MARINATOS, photographs by MAX HIRMER. 188 pages, 28 figures, 43 color plates, 236 black-and-white plates, 1 map, 1 table. Harry N. Abrams, New York $25.00

For many years the illustrations and notes published by Th. Bossert in his *Altkreta* have been used in classroom and out of it to picture the great cultures that developed in Crete and on the mainland of Greece in the Bronze Age. New discoveries by archaeologists and developments in color photography, especially, made that useful volume obsolete and an up-to-date publication imperative. The task of providing such a publication was not an easy one because it had to combine scholarship and artistic ability of high caliber. In our authors these prerequisites were found, and as a result we have a superb volume that meets the most rigorous standard and the highest expectations.

In a lucid, concise but all-inclusive introduction Professor Marinatos gives the story of the development of the Minoan and Mycenaean cultures in the Hellenic world, illustrating it with well chosen descriptive photographs. The objects illustrated in the plates are described and discussed briefly in notes forming the second part of the text. A bibliographical summary is given for each object. Each plate is thus excellently described and documented. Most of the important finds of the last century are illustrated: old favorites such as the gold objects from the Shaft Graves of Mycenae, the Vaphio cups and the frescoes of Crete, as well as objects found in the latest excavations, such as the polychrome vases from Phaestus and the inlaid daggers from the district of Pylos. In the preparation of the text Dr. Marinatos ably used his long association with the Minoan and the Mycenaean world and his great knowledge derived from study, personal experience and excavations conducted by himself and by his colleagues. As a result his text and notes carry authority and are the best introduction to the field for student and layman alike.

The plates form the major part of the volume. They can be characterized by one word: superb. Photographs in color or in black and white were taken directly from the originals and are reproduced in the best possible way. The choice of objects is fortunate, and especially to be noted are landscapes in color which give a good idea of the blue sky, the brilliant light, the clarity of the atmosphere and the colorful fields of Greece that form the setting in which were developed the architecture and objects illustrated. The authors deserve high praise for the beautiful volume they have given to scholars and lovers of art.

GEORGE E. MYLONAS
Washington University

THE ANTIQUITIES OF JORDAN, by G. LANKESTER HARDING. xvii, 206 pages, 10 figures, 31 plates. Thomas Y. Crowell, New York 1959 $4.75

Archaeological treasures lying in remote parts of East Jordan, often overlooked by tourists in the jet age, are described here in an authoritative and interesting volume, written by a field archaeologist who has had over twenty years of experience in Jordan. The chapters on Jerash and Petra are the best and most up-to-date popular accounts of the remains of these two spectacular monuments, written with enthusiastic appreciation but without sentimentality. Reliable information is given about less publicized places such as Ajlun, Araq al-Amir, Karak, Jabal Rum, Umm al-Jamal, Qasr al-Amra and scores of other monuments on the edge of the desert. In addition to the East Jordan sites Harding has included chapters on the Palestinian sites of Jericho, Mafjar and Qumran, which although on the west bank now lie within the Hashemite Kingdom of Jordan.

The book meets the needs of three groups of readers. The tourist who can visit only Jerash, Petra, Amman and the sites at the north end of the Dead Sea will find this his best guide; the more interested student, who can spend a month or two traveling in East Jordan, must have Harding's volume; and the armchair traveler will find the author's descriptions vivid and informative. Harding served with great dedication as Director of Antiquities in Jordan from 1936 to 1956, a period in which there were many hardships and innumerable problems. In addition to his administrative duties

THE HISTORY OF THE GREEK AND ROMAN THEATER

By Margarete Bieber. A much-sought study, now available in a completely rewritten and enlarged volume. In this superb second edition, Dr. Bieber has included a wealth of fascinating new material, mainly archaeological, to enrich her comprehensive survey. For students of theatrical arts as well as of the classics, this authoritative book is an unprecedented source of information. With 865 illustrations, 300 of which are new. 8½" x 11". $17.50

Princeton
University Press
Princeton, New Jersey

he participated in excavations and carried on his own work of research and exploration. Although the Dutch (Dair Alla), the British (Petra), the Jesuits (Talailat Ghassul) and the Americans (Dhiban, Pella, Tannur) have made beginnings, it is to be hoped that this survey of archaeological possibilities in East Jordan will induce other groups to work in this relatively neglected area.

JAMES B. PRITCHARD
Church Divinity School of the Pacific

KELTOVÉ ve STŘEDNÍ ÉVROPE (DIE KELTEN IN MITTELEUROPA), by JAN FILIP. 552 pages, including Russian and German summaries, 103 figures, 132 plates. Czechoslovak Academy of Sciences, Prague 1956 (*Monumenta Archaeologica*, Vol. V)

This massive volume is of interest to the student of the history and archaeology of the continental Celts, the LaTène period, or of Central European archaeology in general. It is hardly for casual reading. Disregarding the conventional LaTène sequence as an arbitrary and preconceived system, Dr. Filip starts afresh with a detailed analysis of the data from over one thousand flat grave cemeteries of the Later Iron Age in Bohemia, Moravia and Slovakia. He deals with the developmental stages and geographic distribution of ceramics, ornaments, weapons and tools, and the Celtic monetary system. Following an interpretive chapter, each cemetery is listed geographically, with a brief summary of its key characteristics, and map and literature citations. There is also an extensive bibliography.

On the basis of evidence from the actual material, Dr. Filip concludes that the beginning of the Celtic movement into Central Europe and toward Italy was not coincident with the spread of an already developed LaTène culture, as has been assumed. Thus, for Central Europe at least, the picture is one of a reduced LaTène dating and an initial period of Celtic occupancy followed by a diffusion of LaTène culture elements and complexes within an already expanded Celtic world. This is an important conclusion, for by freeing the Celtic-LaTène equation of its one-to-one correlation on the eastern side of the Celtic sphere, the analogous situation on the west, in the British Isles particularly, becomes much more intelligible.

In Central Europe Dr. Filip sees the following periods:

1) Before 400 B.C. the Pre-Celtic culture was predominantly Hallstatt with strong relations to the south. To the east were the Scyths.

2) 400 to ± 250 B.C., the period of historical Celtic expansion. Initially this did not show a developed LaTène type of culture, but rather a continuing local Hallstatt development. Celtic graves are distinguishable only by special manufactured objects. Gradually, through contact with neighboring areas, a Celtic-LaTène style became fixed.

3) 250 to ± 125 B.C., the period of Central European concentration, consolidation and transformation of the subsistence pattern. The Celts, under pressure from east and south, concentrated in Central Europe. From differences in grave furniture the author sees the development of at least two social classes, a dominant warrior and priestly stratum and a class of common people. He may, however, be dealing with the survival or taking over of a Hallstatt pattern as recognized in Austria, or perhaps with a Celtic social pattern that became more recognizable in the grave furniture.

4) 125 to ± 50 B.C., the florescence of the *oppida* and the peak of Celtic economic expansion. The builders of the *oppida* had the same type of economy as the Celts of the flat graves. The pressure of the Celts on north and northeast Europe, across the Carpathians and into the Ukraine, as well as to the Black Sea, reached its high point. Mass finds of iron objects, depots of manufactured objects, and fortifications of Gallic type, as described by Caesar, mark this period. Both German and Roman pressures began.

5) After ca. 50 B.C., the decline of the *oppida*. During this phase the major concentration of the Celts shifted to the south. North of the Danube the *oppida* no longer were sources of Celtic strength. The southern Celts developed stronger ties with the Roman world, and the Romans became dominant in the Danube basin.

Although the author modestly describes this work as a beginning, he calls attention to the geographical position of this area as a cultural crossroads and consequently as a key to the unraveling of the Celtic period. This is a major work, indispensable to anyone who wishes to deal with this period and area.

R. W. EHRICH
Brooklyn College

THE STUDY OF GREEK INSCRIPTIONS, by A. G. WOODHEAD. xii, 139 pages, 3 figures, 4 plates. Cambridge University Press, New York 1959 $3.75

A general account of what Greek epigraphy is about and how it works is more than welcome, not only for young students about to explore the higher levels of Classical scholarship but also for mature people whose interests bring them close to the field of epigraphy without requiring them to develop their own expertise. That such an exposition is provided by an authority on the subject with a fine perception for what needs to be known and how to explain this with accuracy as well as humanity, is doubly welcome.

The book—always briefly but to the point—first discusses the general significance of epigraphy today, and the methods whereby the results of epigraphical research are presented to the public; then the formal problems of inscriptions—alphabet, engraving, and types of documents; then problems of dating, restoration, copies and fac-

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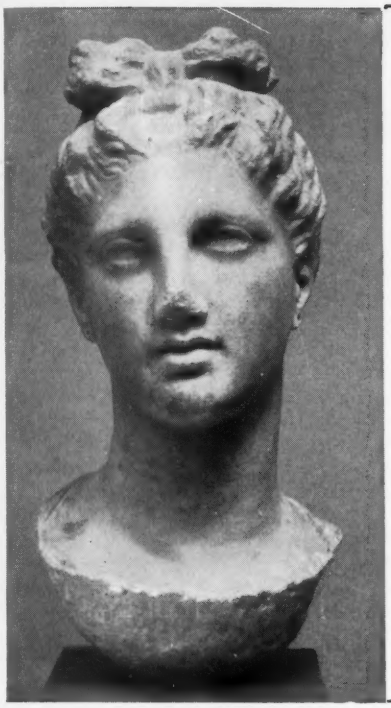

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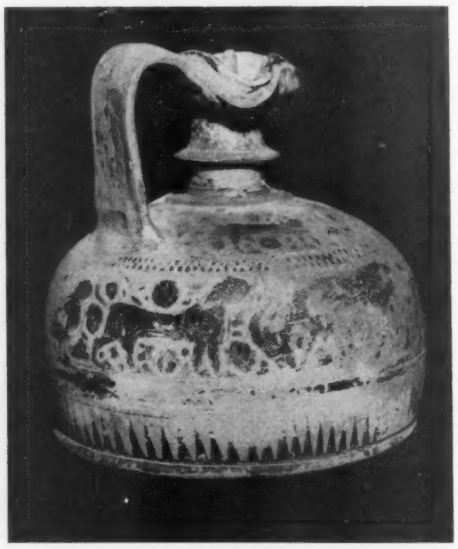
Emory University

A HANDBOOK OF GREEK ART, by GISELA M. A. RICHTER. x, 421 pages, 507 figures, 2 maps. Phaidon Publishers, New York 1959 $7.95

The history of Greek art is inextricably bound up with the study of Greek archaeology, for the latter provides much of the material for the former. A handbook of Greek art serves, therefore, in large measure as a handbook of Greek archaeology as well. As such, this book is the immediate successor to Fowler and Wheeler, *Handbook of Greek Archaeology,* though forty years separate the two publications. Miss Richter emulates the earlier work in her treatment of the material by subject rather than by period; while she adds many categories, she leaves out the valuable introductory material of the earlier work, and her first chapter, "The Forerunners," is in no sense an up-to-date successor to "Prehellenic Greece" in Fowler and Wheeler. In four pages Miss Richter succinctly recounts the course of development of Greece's material culture from its palaeolithic beginnings to the end of the Mycenaean period; the reader will be aware that there is much of interest in this early period, but knowledge of it must be sought elsewhere. More's the pity, since there is no place where such information is readily available.

Greek art of the first millennium B.C. is treated in the following chapters: architecture (38 pages), larger works of sculpture (128), small sculpture (20), decorative metalwork (23), terracottas (16), gems (11), coins (8), jewelry (10), paintings and mosaics (18), pottery and vase-painting (80), furniture (10), textiles (4), glass and glaze (3), ornament (3) and epigraphy (2). The wide discrepancy in the size of the chapters is a reflection in part of the relative importance of each category in the history of Greek art, and in some measure it reflects the amount of available material, but it also depends in good measure on the interests of the author. This is particularly apparent when comparing the sections on architecture and sculpture, which one would expect to be of about equal length, or about the size of the chapter on vase-painting. Certainly these three categories are the major ones. One might ask for more on any of the subjects of the shorter chapters, in all of which Miss Richter is so competent, but the limits of a single volume preclude this and we can only be thankful for the choice bits that are included. What is most important is the authority which exists in every part of the book. This, combined with the profusion of excellent illustrations—and it is a rare pleasure in this day to find a glossy paper edition with illustrations in the text—makes Miss Richter's handbook the



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University of Missouri

THE BELCHER MOUND, a Stratified Caddoan Site in Caddo Parish, Louisiana, by CLARENCE H. WEBB. xiv, 213 pages, 142 figures, 4 tables. Society for American Archaeology, Salt Lake City 1959 (Memoirs of the Society for American Archaeology, No. 16) $3.00

The Belcher Mound site is in northwesternmost Louisiana, in the heart of the land occupied by the ancestors of the historic Caddo. The site was excavated by Dr. Webb and associates in the late 1930's and early 1950's. The mound, which was the main feature of the site, was built up in the course of successive burial rites. In some of these a structure was burned, a grave was dug through the charred remains, the body of an important individual was placed in the grave, accompanied by those of other persons who were probably put to death as part of the funeral rites, the grave was filled, and a layer of earth piled over the whole. Subsequently another structure was built on the same spot, ultimately to be destroyed as part of later obsequies.

The earliest occupation was at the close of Early Caddoan times (technically the Gibson Aspect, Haley Focus), when major temple mound sites in this area were giving way to smaller, less elaborate, more scattered settlements. The later occupations, which derived from the earlier, were Late Caddoan (Fulton Aspect, Bossier and Belcher Foci), the final occupation being possibly as late as A.D. 1650. The grave goods in the later burials are rich by Late Caddoan standards and represent a climax of local craftsmanship.

Dr. Webb begins this excellent monograph with a review of Caddoan history and prehistory. He then describes the site and the excavations in detail. Thereafter the data are treated under the following headings: Houses and Other Features, Burials, Pottery, Artifacts, Food Remains. Each section includes an exhaustive description and illustration of the discoveries, followed by a discussion in which the trait under consideration is fitted into its place not only in Caddoan culture history but in the history of a much wider area, sometimes the whole continent. Then the total information is summarized and Dr. Webb presents his tentative reconstruction of Late Caddoan prehistory in the light of this new information.

Dr. Webb has asked reviewers to note the inadvertent omission of credits for illustrations to Alex D. Krieger, Steve Sanchez, Gordon W. Maxcy, William Grabill, and the Caddo Parish Agriculture Department.

This is a well written, well organized, unusually fully illustrated report. As the second major monograph published on the excavations of a Caddoan site, it marks an important step in the study of this area. Specialists will make frequent use of this report because of its exhaustive and meticulous detail. Non-specialists will find it a most valuable reference because of its comparative discussions and summations.

E. MOTT DAVIS
The University of Texas

THE PREHISTORY OF SOUTHERN AFRICA, by J. DESMOND CLARK. xxvi, 341 pages, 71 figures, 15 maps. Penguin Books, Baltimore 1959 $1.50

Historians should never forget that their fields of study, circumscribed in time and in place, are parts of something wider; in this they differ from scientists, who may often compartmentalize themselves. Dr. Clark's book is an excellent summary of the prehistoric periods of Southern Africa, from early in the Pleistocene until very recent times, so far as research has been carried. In most territories research has been patchy; some are still almost complete blanks. But we miss a chapter on Southern Africa's place in the rest of the Pleistocene world, a chapter on correlations by climatic variation, sea-levels, and other techniques by which Pleistocene chronology is beginning to take shape. There has recently been caution among African prehistorians against long-distance correlations, in denial of what seemed to be nebulous constructs

current a few years ago. But this reaction must beware of timidity; consolidation must be the stepping-stone to fresh advance.

Those who seek what is known about Southern Africa will find in this book an excellent summary, illustrated as lavishly as the format will allow. Distribution-maps are necessarily tentative in a continent so unequally explored. The objects drawn are well chosen, and the photographs give an excellent purview. Dr. Clark uses his knowledge of ethnology to elucidate archaeological problems; he never allows the work to become a dry catalogue but asks what things were used for, what were the conditions of life, thus maintaining the human interest of his human story.

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THE ORIGINS OF ORIENTAL CIVILIZATION, by WALTER A. FAIRSERVIS, JR. 192 pages, 24 figures, 10 plates. New American Library, New York 1959 (Mentor: Ancient Civilizations) $0.50

This is a creditable attempt to summarize the prehistoric Far East, a very difficult task by the author's admission. In the first three chapters Mr. Fairservis gives a succinct but highly useful background for the prehistory of East Asia. He has nicely compressed into some thirty pages the geographical, geological and ecological material needed for this type of book. Then, starting with Java, he proceeds to China and lucidly discusses early man there and the origin and development of Chinese civilization through the Shang dynasty. The last two chapters deal with Japan and peripheral regions such as Korea, Manchuria, Mongolia and Siberia.

Eight chapters of the fourteen are devoted to China, and here one may seriously question the author's methodology. When over half of the book is concerned with China, why are Chinese sources not used? Instead of relying upon secondary sources and translations or summaries of several Chinese reports, why did he not enlist the aid of a Chinese research assistant and utilize the latest Chinese archaeological reports? Such material is easily available in the United States. Many finds of importance have been made during the last ten years, and reports on these and other finds are coming out in considerable volume and are of primary importance for the work under review. Also ignored are the important Chinese publications on archaeology written by scholars in Formosa.

As the work now stands, it is a good synthesis of western language materials (some of which are now out of date) and may be used, with definite reservations, as an introduction to the prehistory of the Far East. But this reviewer would like to see a revised edition of this book with the appropriate sections based on Chinese materials—and especially on recent publications. Such a work would be an excellent textbook for courses dealing with early man in East Asia and the origins of Chinese civilization, and would fill a definite need.

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PARACAS, NAZCA, AND TIAHUANACOID CULTURAL RELATIONSHIPS IN SOUTH COASTAL PERU, by WILLIAM DUNCAN STRONG. vi, 48 pages, 18 figures, 4 tables, frontispiece. The Society for American Archaeology, Salt Lake City, Utah 1957 (Memoirs of the Society for American Archaeology, No. 13, Supplement to American Antiquity, Vol. XXII, No. 4, Part 2) $1.00

A preliminary report on the Columbia University expedition led by Dr. Strong to southern Peru in 1952-53, giving the results of surface studies and excavations that throw light on the controversial temporal and cultural relations of the Paracas Cavernas, Paracas Necropolis, Nazca and Tiahuanaco cultures. The major part of the text is a detailed description, well illustrated, of ceramic types—mainly pre-Tiahuanaco—characteristic

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of the various chronological phases. Cultural sequences from pre-ceramic and pre-agricultural to Late Nazca are traced, and radiocarbon dates given.

MAN'S JOURNEY THROUGH TIME, by L. S. PALMER. xv, 184 pages, frontispiece, 55 figures, 1 plate, 9 tables. Philosophical Library, New York 1959

Professor Palmer is concerned with the study of the principles behind the many chronologies which have grown up for the measurement of man's physical and cultural development. After an examination of the anatomical, cultural, geological and botanical systems of chronology and brief consideration of typological and radiocarbon measurements, he attempts to extrapolate a generalized chronology with evolutionary significance, which is likely to leave the reader in confusion.

THE GENUCILIA GROUP: A Class of Etruscan Red-Figured Plates, by MARIO A. DEL CHIARO. 130 pages, 10 figures, 15 plates, frontispiece. University of California Press, Berkeley and Los Angeles 1957 (University of California Publications in Classical Archaeology, Vol. 3, No. 4) $3.00

A detailed study of a class of Etruscan pottery, plates or shallow bowls on a stemmed base with a spreading foot, decorated on the interior in red-figured technique, usually with large female heads but sometimes with star patterns or various abstract designs. Made from about 400-250 B.C., an earlier series in the region of Falerii and a later at Caere, they attained wide currency in west-central Italy. Some hundreds of examples are recorded here; many more have been found since this study was made. In general of little artistic merit, the group is important archaeologically, and this study makes it well known to archaeologists.

RUNES: an Introduction, by R. W. V. ELLIOTT. xvi, 124 pages, 2 figures, 24 plates, 5 tables, 2 maps. Philosophical Library, New York 1959 $10.00

The Germanic runic alphabet, which rose in northern Italy in the last half of the first millennium B.C., according to current thought in this difficult field, is traced northward among the Germanic peoples as far as Scandinavia. After a discussion of the origin and diffusion of the runic alphabet on the Continent, Elliott devotes most of his book to the use of runic writing in England. For the archaeologist interested in Britain, runic inscriptions are important because they occur on coins, weapons, sepulchral stones, crosses and ivories.

IL NURAGHE DI BARUMINI e la stratigrafia nuragica, by GIOVANNI LILLIU. 387 pages, 80 plates. Gallizzi, Sassari 1955 (Università degli Studi di Cagliari, Istituto per gli Studi Sardi) 7,000 lire

This remarkable monument was briefly presented in *American Journal of Archaeology* 62 (1958) 426-427. In the present volume it is published in full, and twelve other examples are cited. Attention is paid to the ceramic and other minor finds with their evidence as to culture and dating. Fundamental for the Bronze Age in Sardinia.

STUDIES IN ANCIENT TECHNOLOGY. Vol. V. viii, 235 pages, 36 figures. E. J. Brill, Leiden 1957 20 guilders

In this fifth volume of the series, which treats Leather, Sugar and its Substitutes, and Glass, Dr. Forbes continues to astonish us with the breadth and depth of his knowledge. The extensive section on Glass is the most important, including discussion of techniques, historical development, ancient texts, origins and geographical distribution. For the convenient assemblage of literary sources alone the volume is indispensable.

THE MEGALITH BUILDERS OF WESTERN EUROPE, by GLYN DANIEL. 142 pages, 25 figures, 8 plates. Frederick A. Praeger, New York 1958 $3.50

The tombs and temples of large stone construction long known as megalithic occur in great numbers in western and northern Europe in the later third and the second millennium B.C. The outlines of their distribution in the western Mediterranean, Iberia, France, the British Isles, north Germany and Scandinavia is given in most of the general surveys of European prehistory. Here Daniel makes a real contribution through his clarification of the many types of megalithic monuments and his systematic review of the theories concerning their origin and diffusion which have been put forward since James Fergusson's *Rude Stone Monuments.* . . . (1872).

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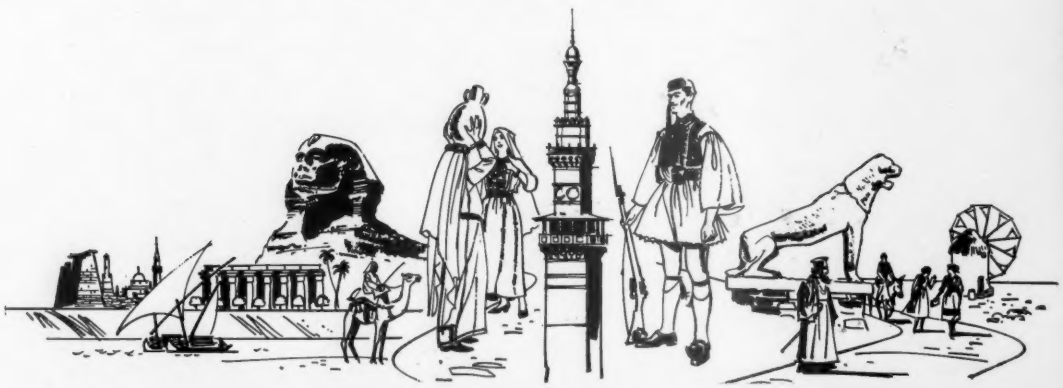
Brochures available on request.